



General Certificate of Secondary Education
2011–2012

Science: Single Award (Modular)
Electricity, Waves and Communication
Module 5
Foundation Tier
[GSC51]



THURSDAY 24 MAY 2012, 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.

Centre Number

71

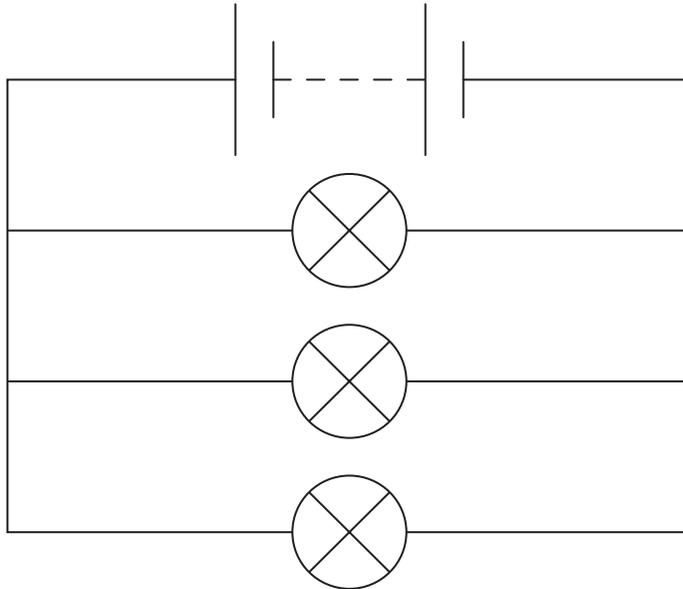
Candidate Number

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

Total Marks



- 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 6V in the circuit above. How much voltage will each bulb receive?

Choose from:

3V

6V

2V

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]

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

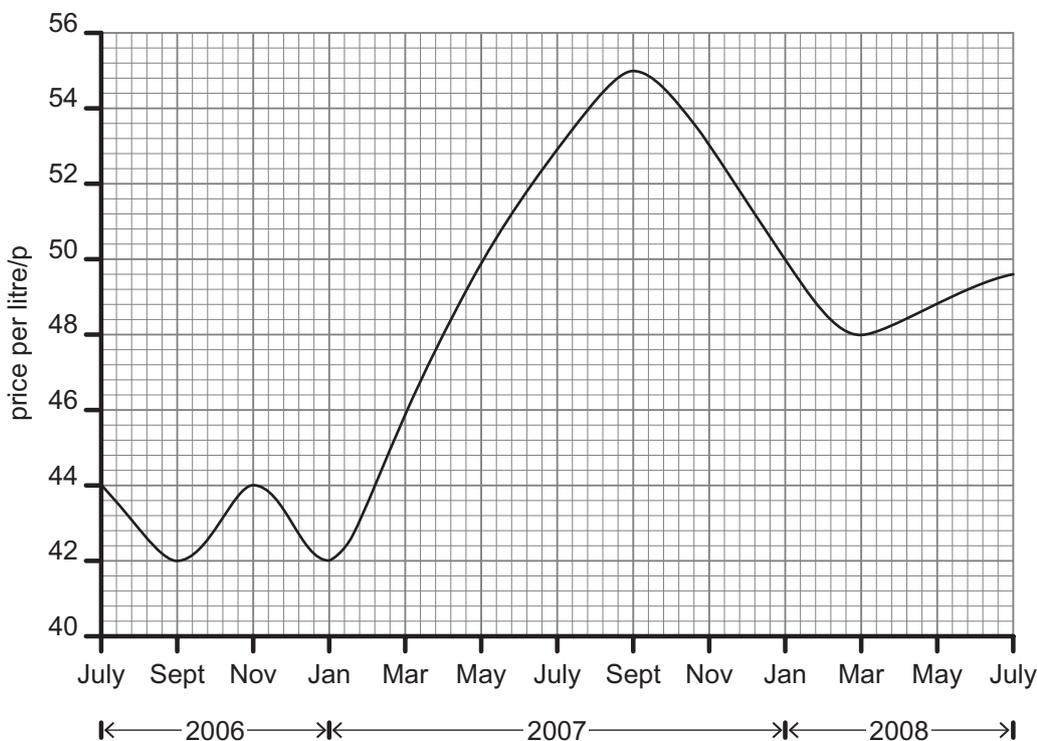
A source that releases energy through radioactive decay

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]

(ii) During which period of time did gas cost more than 50p 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]

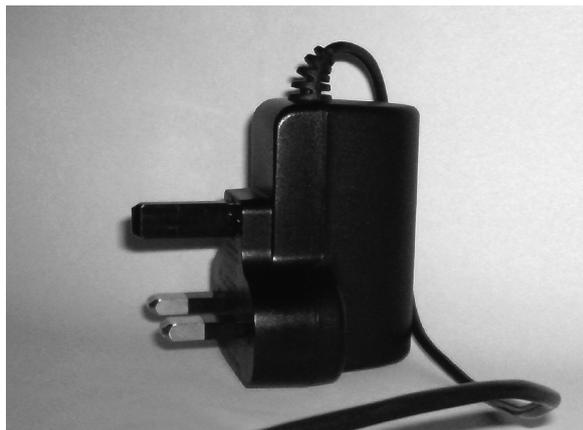
(iv) Explain fully an environmental disadvantage to using oil or gas in power stations.

_____ [2]

Examiner Only

Marks Remark

- 3 The picture below shows a mobile phone charger.



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

Use the equation:

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

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]

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.

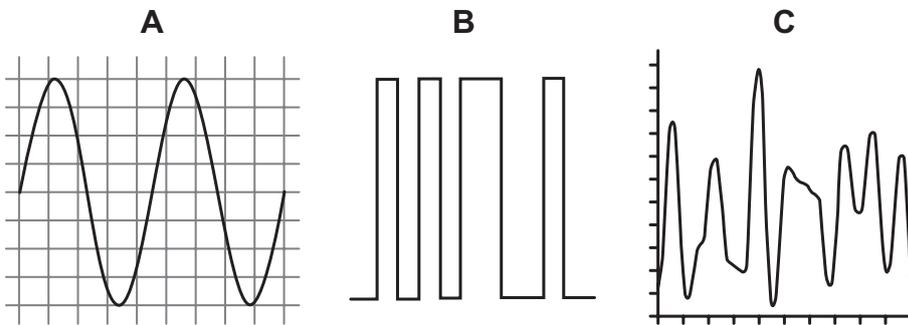
_____ [1]

(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?



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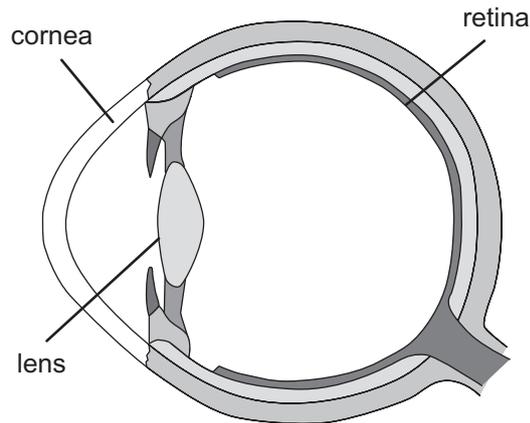
Answer _____ [1]

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

 _____ [1]

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]

Examiner Only	
Marks	Remark

(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?

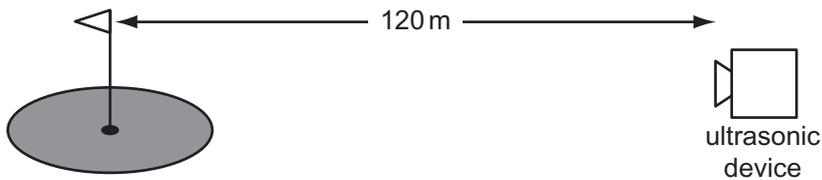
_____ [1]

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

_____ [1]

Examiner Only	
Marks	Remark

- 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 120m and the return time for the signal was 0.8s.

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]

- (b) (i) Explain fully what is meant by the term “ultrasound”.

_____ [2]

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

_____ [1]

Examiner Only	
Marks	Remark

(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

- 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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Marks

Remark

THIS IS THE END OF THE QUESTION PAPER

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