Rewarding Learning

General Certificate of Secondary Education 2009-2010

## Science: Single Award (Modular)

## Electricity, Waves and Communication

 Module 5Foundation Tier
[GSC51]

Candidate Number
$\square$

## 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 <br> use only |  |
| :---: | :---: |
| Question <br> Number | Marks |
| 1 |  |
| 2 |  |
| 3 |  |
| 4 |  |
| 5 |  |
| 6 |  |
| Total <br> Marks |  |

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

Meter (1) is connected in $\qquad$ in the circuit.
(iii) Give two changes you would see if more batteries were added to

1. $\qquad$
2. $\qquad$
$\qquad$

## the circuit above.

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

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

to calculate the resistance of the bulb.

## Show your working.

Answer =
$\qquad$ $\Omega$
(c) Complete the circuit diagram below to show two bulbs connected in parallel.


2 (a) (i) Complete the following sentence about mobile phones.
Choose from:
city infra-red microwave mast

Mobile phones work by sending $\qquad$ signals to the nearest $\qquad$ which acts as a repeater station.
(ii) What is the area around a mast called?
(iii) Name a disease associated with long-term use of mobile phones.
(b) (i) Which diagram below shows a digital signal?

A

B

C

Answer (A, B or C)
(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

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

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

(ii) Apart from the Earth wire, name one other safety feature of this plug.
$\qquad$
(b) For safety reasons manufacturers are now supplying their appliances already fitted with the type of plug shown below.

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

1. $\qquad$
$\qquad$
2. $\qquad$
$\qquad$
(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
(iii) Name the wire not required inside the plug if the laptop is double insulated.

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 $\qquad$ hours
(ii) How many watts are in 1 kW ?
(iii) Suggest a reason for the drop in power output during midafternoon.
(iv) Draw a line on the graph above to show what the power output might be on a typical winter day.
(b) (i) Solar power is described as a renewable energy source.

What is meant by the term renewable energy?
$\qquad$
(ii) Explain fully how using renewable energy sources, such as solar power, reduces the amount of air pollution.
$\qquad$
$\qquad$
$\qquad$

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.
$\qquad$
$\qquad$
$\qquad$
(ii) Name the other type of lens.
$\qquad$
(b) The spectacles above are used to correct long sight.

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

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.

(ii) State the conclusion that can be drawn from these results.
(iii) Use the graph to find the distance from the loudspeaker that gives a noise level of 80 dB .

Answer $\qquad$ 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 $\qquad$ m [1]
(b) The walls of modern concert halls are lined with soft material. Explain fully why this is done.
$\qquad$
$\qquad$
$\qquad$
(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 ?

