Level 3 Certificate and Extended Certificate in Applied Science
KEY CONCEPTS IN SCIENCE

Unit Number: ASC1
Section C – ASC1/P (Physics)

Thursday 22 June 2017 Morning
Time allowed: 1 hour 30 minutes. You are advised to spend approximately 30 minutes on this section

Materials
For this paper you must have:
• a calculator
• Formula sheet

Instructions
• Use black ink or black ball-point pen.
• Answer all questions in each section.
• You must answer the questions in the spaces provided.
• Do not write outside the box around each page or on blank pages.
• Do all rough work in this book.
• Cross through any work you do not want to be marked.
• The total time for all three sections of this paper is one-and-a-half hours.

Information
• You will be provided with a copy of the formula sheet.
• There are three sections in this paper:
  Section A – Biology   Section B – Chemistry   Section C – Physics.
• The marks for questions are shown in brackets.
• The maximum mark for this paper is 60 and the maximum mark for this section is 20.

Advice
Read each question carefully.
A technician investigated the voltage and current characteristics for an electrical component.

Table 1 shows the technician’s results.

<table>
<thead>
<tr>
<th>Voltage (V)</th>
<th>0.00</th>
<th>2.00</th>
<th>4.00</th>
<th>6.00</th>
<th>8.00</th>
<th>10.00</th>
<th>12.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current (A)</td>
<td>0.00</td>
<td>0.74</td>
<td>1.38</td>
<td>1.90</td>
<td>2.23</td>
<td>2.42</td>
<td>2.50</td>
</tr>
</tbody>
</table>

Plot a graph of the values in Table 1 on Figure 1. Add appropriate scales and labels to the axes.

Draw a line of best fit.
01.2 State the name of the electrical component which the technician was investigating. [1 mark]

Tick (✓) one box.

A  Semi-conducting diode
B  Filament lamp
C  Thermistor
D  Resistor at constant temperature

01.3 Calculate the resistance of the electrical component when the voltage across it is 2 V.

State the correct unit in your answer. [2 marks]

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Resistance = ___________________________

01.4 As the voltage across the electrical component increases, its resistance increases. Explain why. [3 marks]

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An automotive engineer is performing crash tests on a new model of car. The ‘crumple zone’ at the front of the car is designed to reduce injuries in a crash. **Figure 2** shows one of the tests carried out by the automotive engineer.

**Figure 2**

State the Law of Conservation of Momentum.

[2 marks]

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2.2 Explain how the ‘crumple zone’ can reduce the chance of serious injury in a crash.

[4 marks]

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2.3 Describe the energy changes as the car crashes.

[3 marks]

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State two ways the engineer could increase the momentum of the test car before the crash.

[2 marks]

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END OF QUESTIONS
There are no questions printed on this page