Level 3 Certificate and Extended Certificate in Applied Science

KEY CONCEPTS IN SCIENCE

Unit Number: ASC1
Section A – ASC1/B (Biology)

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.
Cell biologists explore the functions of cells.

Figure 1 shows a cell.

A cell biologist concludes that the cell in Figure 1 is a prokaryotic cell. Give two reasons to support this conclusion.

[2 marks]

Reason 1

________________________________________________________________________________

Reason 2

________________________________________________________________________________
What is the function of the rough endoplasmic reticulum (RER) in eukaryotic cells?

[1 mark]

Tick (√) one box.

- Digests worn out organelles
- Packages proteins for secretion
- Produces lipids and steroid hormones
- Produces proteins

Knowledge of how substances interact with cell membranes is important in the development of new drugs.

Figure 2 shows a cell membrane.

Name parts A and B in Figure 2.

A ______________________________________

B ______________________________________

What is the function of part A in Figure 2?

________________________________________________________________________________

________________________________________________________________________________

________________________________________________________________________________

Turn over
Figure 3 shows a heart.

Complete Table 1 to identify parts of the heart. Tick (✓) the box that corresponds to the right answer.

Table 1

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aorta</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Atrioventricular node (AVN)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Purkinje fibres</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sinoatrial node (SAN)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Some children are born with a disorder called histiocytoid cardiomyopathy (HC).

The Purkinje fibres do not form properly in a child with HC. The symptoms of HC include arrhythmia.

Explain why HC causes arrhythmia.

[2 marks]
Diabetes is a disorder that disrupts the homeostatic control of blood glucose level.

What is the normal range for blood glucose?

[1 mark]

Normal range = _________________ mg/dL

When a doctor thinks a person has diabetes they can test the person’s urine for glucose.

Describe how the urine test is done.

[2 marks]

________________________________________________________________________________

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________________________________________________________________________________

________________________________________________________________________________

________________________________________________________________________________

________________________________________________________________________________

Question 3 continues on the next page
A man is diagnosed with Type 2 diabetes. A dietician asks the man to keep a food and exercise diary.

Figure 4 shows part of his diary.

**Figure 4**

<table>
<thead>
<tr>
<th></th>
<th>Thursday</th>
<th>Friday</th>
<th>Saturday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breakfast</td>
<td>Toast and egg</td>
<td>Chocolate pancake</td>
<td>Bacon, egg and sausage</td>
</tr>
<tr>
<td>Morning snack</td>
<td>Doughnut</td>
<td>Cake</td>
<td>Biscuit</td>
</tr>
<tr>
<td>Lunch</td>
<td>Ham sandwich</td>
<td>Cheese sandwich</td>
<td>Soup</td>
</tr>
<tr>
<td>Dinner</td>
<td>Chicken pasta</td>
<td>Chicken and chips</td>
<td>Pizza</td>
</tr>
<tr>
<td>Evening snack</td>
<td>2 pints of beer and</td>
<td>3 pints of beer</td>
<td>Crisps and wine</td>
</tr>
<tr>
<td></td>
<td>a bar of chocolate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exercise</td>
<td>10 minute walk</td>
<td>None</td>
<td>30 minute walk</td>
</tr>
</tbody>
</table>

Suggest two changes the dietician could recommend to the man, to help control his Type 2 diabetes.

Use the information from Figure 4 in your answer.

[2 marks]
The man forgets to eat his lunch and dinner. His blood glucose level drops dangerously low.

Explain how the body responds to bring his blood glucose level back to normal.

[5 marks]

________________________________________________________________________________
________________________________________________________________________________
________________________________________________________________________________
________________________________________________________________________________
________________________________________________________________________________
________________________________________________________________________________
________________________________________________________________________________
________________________________________________________________________________

END OF QUESTIONS