Tuesday 22 January 2019       Morning

Materials
For this paper you must have:
• a calculator
• Formulae 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.
• If you need extra space for your answer(s), use the lined pages at the end of this book. Write the question number against your answer(s).
• Do all rough work in this book. Cross through any work you do not want to be marked.

Information
• You will be provided with a copy of the Formulae 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.
### Section A – Biology

Answer all questions in this section.

| 01 | Homeostasis maintains the body’s internal environment. When the body’s internal environment changes too much it can cause damage and make people very ill. |
| 01.1 | Homeostasis controls body temperature and blood pH. What is the normal range for body temperature? [1 mark] 

   _________________ °C to _________________ °C |

| 01.2 | What is the normal range for blood pH? 
 Tick (✓) one box. [1 mark] |

- 7.00 – 8.00 
- 7.00 – 7.35 
- 7.35 – 7.45 
- 7.85 – 8.50
Hormones are used for negative feedback in homeostasis.

Draw one line from each hormone to its function.

<table>
<thead>
<tr>
<th>Hormone</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADH (antidiuretic hormone)</td>
<td>controls water retention</td>
</tr>
<tr>
<td>Glucagon</td>
<td>converts glucose to glycogen</td>
</tr>
<tr>
<td>Insulin</td>
<td>converts glycogen to glucose</td>
</tr>
<tr>
<td></td>
<td>controls heart rate</td>
</tr>
<tr>
<td></td>
<td>controls sodium reabsorption in the kidney</td>
</tr>
</tbody>
</table>

Question 1 continues on the next page
People with diabetes cannot effectively control the concentration of glucose in their blood.

**Figure 1** shows how the percentage of people with diabetes changes as the percentage of people with obesity changes in a population.

**Figure 1**

Give one conclusion based on the data in **Figure 1**.

[1 mark]
Cell membranes are partially permeable and control what substances can enter cells.

**Figure 2** shows a cell membrane.

**Figure 2**

---

**02.1** Name A and B.

A

B

[2 marks]

---

**02.2** What is the function of part C?

Tick (✔) one box.

[1 mark]

- Active transport
- Allows oxygen to diffuse through
- Cell recognition
- Facilitated diffusion

---

**02.3** Which organelle synthesises phospholipids in eukaryotic cells?

[1 mark]

---

**Question 2 continues on the next page**
When parts of the cell membrane are damaged they are broken down by the cell. Which organelle breaks down damaged cell parts in eukaryotic cells? [1 mark]

Eukaryotic cells and prokaryotic cells have different characteristics. Some prokaryotic cells contain plasmids. Describe the function of plasmids. [1 mark]
Tomato plants can be grown in greenhouses, either in soil or using hydroponic methods.

Plants grown using hydroponic methods are grown in water with nutrients added.

**Table 1** gives information about tomatoes grown in soil and tomatoes grown using hydroponic methods.

<table>
<thead>
<tr>
<th></th>
<th>Tomatoes grown in soil</th>
<th>Tomatoes grown using hydroponic methods</th>
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</thead>
<tbody>
<tr>
<td>Number of plants per m²</td>
<td>1.2</td>
<td>2.4</td>
</tr>
<tr>
<td>Annual production in kg per 10 000 m²</td>
<td>69 700</td>
<td>580 000</td>
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</tbody>
</table>

**Table 1** shows that tomatoes grown using hydroponic methods produces a higher yield of tomatoes than those grown in soil.

Suggest two reasons why.

[2 marks]

1. 

2. 

Tomatoes grown using hydroponic methods use a lot more water than tomatoes grown in soil.

Describe what happens to water molecules during the light-dependent stage of photosynthesis.

[2 marks]

Question 3 continues on the next page
Tomatoes are at the start of different food chains.

What name is given to the organism at the start of food chains? [1 mark]

Tomatoes can be eaten as part of a meat-free diet.

Give two advantages of eating a meat-free diet. [2 marks]

1

2

Give one disadvantage of eating a meat-free diet. [1 mark]

END OF QUESTIONS
<table>
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<tr>
<th>Question number</th>
<th>Additional page, if required. Write the question numbers in the left-hand margin.</th>
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