Q1.

The diagram shows a section through a leaf.

(i) Complete the sentence by putting a cross ( ✗ ) in the box next to your answer.

The cell that will make the most glucose is

A
B
C
D

(ii) Describe how carbon dioxide enters the leaf.

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Examiner's Report

Q1.

Q1(i)--(ii)
Candidates did not seem to be phased by Q1 being about photosynthesis and some very good responses were seen. Very few blank responses were seen. The multiplechoice part (a)(i) was answered correctly by many candidates with the commonest incorrect response being C, the spongy mesophyll cell. In part (a)(ii), many candidates mentioned that carbon dioxide entered through the stomata but did not extend their answers further.

(i) Describe how carbon dioxide enters the leaf.

The carbon dioxide enters the leaf through the stomata, the oxygen diffuses out of the leaf via stomata and the carbon dioxide enters through the stomata. It moves from a high concentration to a low is caused diffusion.

Results Plus: Examiner Comments
This candidate did score two marks but got side-tracked into giving information irrelevant to the question (which we can ignore). The last statement is a bit ambiguous as to what 'it' refers to, but we gave benefit of the doubt as the rest of the account was clear.

Results Plus: Examiner Tip
Try to avoid the use of words like 'it' and 'they'. It is safer to use the noun that you are referring to.

(ii) Describe how carbon dioxide enters the leaf.

Carbon dioxide enters the leaf through the stomata which opens and closes to let gasess out and in. The guard cells may also let some CO2 into the leaf.

Results Plus: Examiner Comments
This was a common one-mark response that we saw, even from the better candidates. This particular answer earned only one of the two marks available by omitting any reference to the process of diffusion.

Results Plus: Examiner Tip
Always look to see how many marks have been allocated to a question. Then make
sure that you give the same number of scientific facts as there are marks. You will not be awarded two marks for one piece of information.

(iii) We saw some very good answers to this question on photosynthesis, although it is a topic that candidates typically have difficulty with. It is worth noting that we were prepared to award mark point 2 for chlorophyll/chloroplast and mark point 4 for light energy if included in an equation, provided that the terms ‘chlorophyll’ and ‘light’ were written on the arrow and not as a substrate.

(iii) Describe the process that takes place in the leaf to produce oxygen.

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This process is photosynthesis where carbon dioxide reacts with water and the light energy to produce oxygen, glucose and energy. The CO₂ enters from diffusion at the stomata. The water enters from osmosis through roots and the products made are oxygen and glucose (energy). Photosynthesis is how the plant makes food by using light energy.
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**Results Plus: Examiner Comments**

This candidate was awarded all three marks. The descriptive response covered mark points 1, 3 and 5 by including photosynthesis, carbon dioxide, water and glucose. The candidate could have been awarded mark point 4 for talking about light energy at the end but had already gained the maximum marks available. It should be noted that we did not like the suggestion that carbon dioxide and water ‘reacts with the light energy’ at the beginning of this particular response.

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(iii) Describe the process that takes place in the leaf to produce oxygen.

The process is called Photosynthesis.
This is when the leaf uses sunlight to make food for the plant.
The equation is: CO₂ + H₂O + light energy → O₂ + glucose

The plant uses glucose as its food supply.
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**Results Plus: Examiner Comments**

Mark points 3 and 5 could be awarded from this equation for identifying that carbon dioxide and water are the reactants and glucose is also produced. Therefore this response gained two marks.

**Results Plus: Examiner Tip**

Food is too vague for glucose (or sugar).
If you are going to use chemical formulae, then they must be completely correct: upper and lower case letters must be correct and numbers must be subscript. It is safer to
Mark Scheme

Q1.

<table>
<thead>
<tr>
<th>Answer</th>
<th>Acceptable answers</th>
<th>Mark</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i) B</td>
<td></td>
<td></td>
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</tbody>
</table>
| (ii) Any two from the following:  
  - diffusion (1)  
  - from an area of high concentration to an area of low concentration/down a concentration gradient (1)  
  - through stoma / stomata (1) | Accept pores / between guard cells  
Ignore through guard cells | (2) |
| (iii) Any three from the following:  
  - (by) photosynthesis (1)  
  - ref to chloroplast / chlorophyll (1)  
  - requires carbon dioxide and water (1)  
  - light (energy) needed (for photosynthesis)(1)  
  - (to produce) glucose (1) | Ignore incorrect balancing of equations throughout  
Reject (and) respiration  
Accept if written on arrow in word / formula equation  
Accept correct formulae  
word / formula equation  
Accept if written on arrow in word / formula equation  
Reject energy is created / produced  
Accept sugar from word / formula equation | (3) |