

Mark scheme higher test – plants and photosynthesis

| Sub-section       | Mark     | Answer   | Accept                            | Neutral answer | Do not accept                               |
|-------------------|----------|--|-----------------------------------|----------------|---|
| (a)               | 2        | carbon dioxide;<br>oxygen;   | CO <sub>2</sub><br>O <sub>2</sub> |                | CO <sup>2</sup> / CO2<br>O2/ O <sup>2</sup> |
| (b)               | 2        | {contains/ has} chlorophyll/ chlorophyll is found in chloroplast;<br><br>Absorbs light ; | {traps/ takes in} light           |                | Chlorophyll alone<br><br>attracts light     |
| (c)               | 2        | (rate ) increases then {plateaus/ stays the same};<br>at 3 a.u. light intensity;         |                                   |                |   |
|                   | 2        | 80 - 50;<br>30;  | Correct answer = 2 marks          |                |   |
| <b>Total Mark</b> | <b>8</b> |  |                                   |                |   |

8/3 (a) carbon dioxide/CO<sub>2</sub> (not CO<sup>2</sup> or Co<sub>2</sub> etc) required for photosynthesis/starch manufacture; 1

(b) (i) {Boil/ heat} in {alcohol/methanol/ethanol};  
Boiling water = neutral 1

(ii) Iodine (solution); 1

(iii) no CO<sub>2</sub>/ CO<sub>2</sub> absorbed by sodium hydroxide;  
no photosynthesis;  
no starch produced; 3

(c) Control/ to make a comparison; 1

(d) because you wouldn't know whether it was the lack of light or lack of carbon dioxide which prevented photosynthesis/starch production;  
Answer must refer to both carbon dioxide and light limiting photosynthesis 1

**Question 8/3 Total [8]**

|     |       |  |   |
|-----|-------|--|---|
| (a) | (i)   | Carbon dioxide CO <sub>2</sub> ; NOT Co<br>Water/H <sub>2</sub> O;   | 2 |
|     | (ii)  | Chlorophyll;   | 1 |
| (b) | (i)   | I suitable scale;  | 1 |
|     |       | II all plots correct; (tolerance +/- 0.5 small square)<br>1 error = 1 mark, 2 errors = 0 mark  | 2 |
|     |       | III line quality;  | 1 |
|     | (ii)  | I rises/increases;   | 1 |
|     |       | II 22-25   | 1 |
|     | (iii) | Same plant/same time;<br>NOT – ref to repeating/reliability  | 1 |
| (c) |       | Respiration/{release/ for}energy/cellulose/cell wall/(storage<br>as) starch/ protein;<br>NOT {create/produce/make} energy<br>NOT food/growth (this could be neutral) | 1 |

Drop leaf in boiling water to {kill the leaf/ burst the chloroplasts/  
{burst/destroy} cell membranes/ to get rid of waxy cuticle}

Boil the leaf in ethanol/alcohol/methanol to remove the  
chlorophyll

Place the leaf in water to soften it

Spread the leaf on a white tile (or any suitable surface)

Add iodine solution to the leaf surface to test for starch

If leaf turns {blue-black/ black} starch is present

5 – 6 marks

The candidate constructs an articulate, integrated account correctly linking relevant points, such as those in the indicative content, which shows sequential reasoning. The answer fully addresses the question with no irrelevant inclusions or significant omissions. The candidate uses appropriate scientific terminology and accurate spelling, punctuation and grammar.

3 – 4 marks

The candidate constructs an account correctly linking some relevant points, such as those in the indicative content, showing some reasoning. The answer addresses the question with some omissions. The candidate uses mainly appropriate scientific terminology and some accurate spelling, punctuation and grammar.

1 – 2 marks

The candidate makes some relevant points, such as those in the indicative content, showing limited reasoning. The answer addresses the question with significant omissions. The candidate uses limited scientific terminology and inaccuracies in spelling, punctuation and grammar.