Higher tier Plants and Photosynthesis

1 (a) (i) Complete the following equation for photosynthesis in green plants.

..... + water $\xrightarrow{\text{light}}$ glucose + ... [1]

(ii) Name the chemical substance which absorbs the light needed for photosynthesis. [1]

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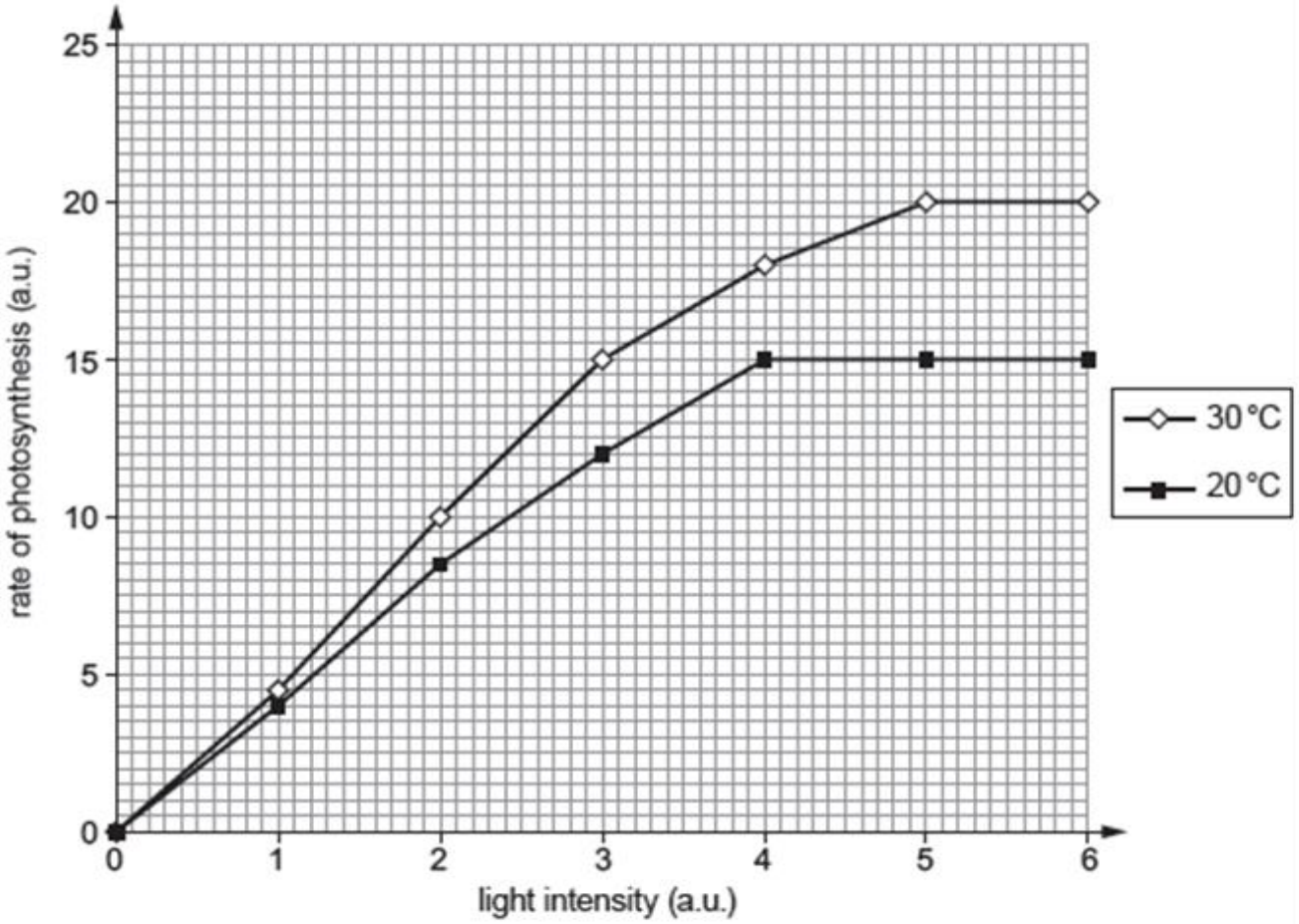
(b) A scientist investigated the rate of photosynthesis at different light intensities and temperatures. The results are shown in the graph.



Use the graph to:

(i) Describe in detail how light intensity affected the rate of photosynthesis at **20 °C**. [2]

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(ii) Calculate the difference in the rate of photosynthesis between 20 °C and 30 °C at a light intensity of 3.5 a.u. [2]

difference in rate of photosynthesis ..... a.u.

(iii) Name **one** *other* environmental factor which can affect the rate of photosynthesis. [1]

.....

(c) Complete the table to show **two** ways in which plants use the glucose produced in photosynthesis. [2]

substance produced from glucose	how the substance is used in a green plant
.....	storage
cellulose	.....

2 Describe the process of photosynthesis with reference to the production of materials in plant cells. In your account, identify relevant limiting factors. [6 QWC]

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3. A plant was destarched. A leaf on the plant was treated as shown in diagram **M** below. The plant was then placed in bright sunlight for 6 hours. The leaf was removed and tested for starch. The result is shown in diagram **N**.

Diagram **M**

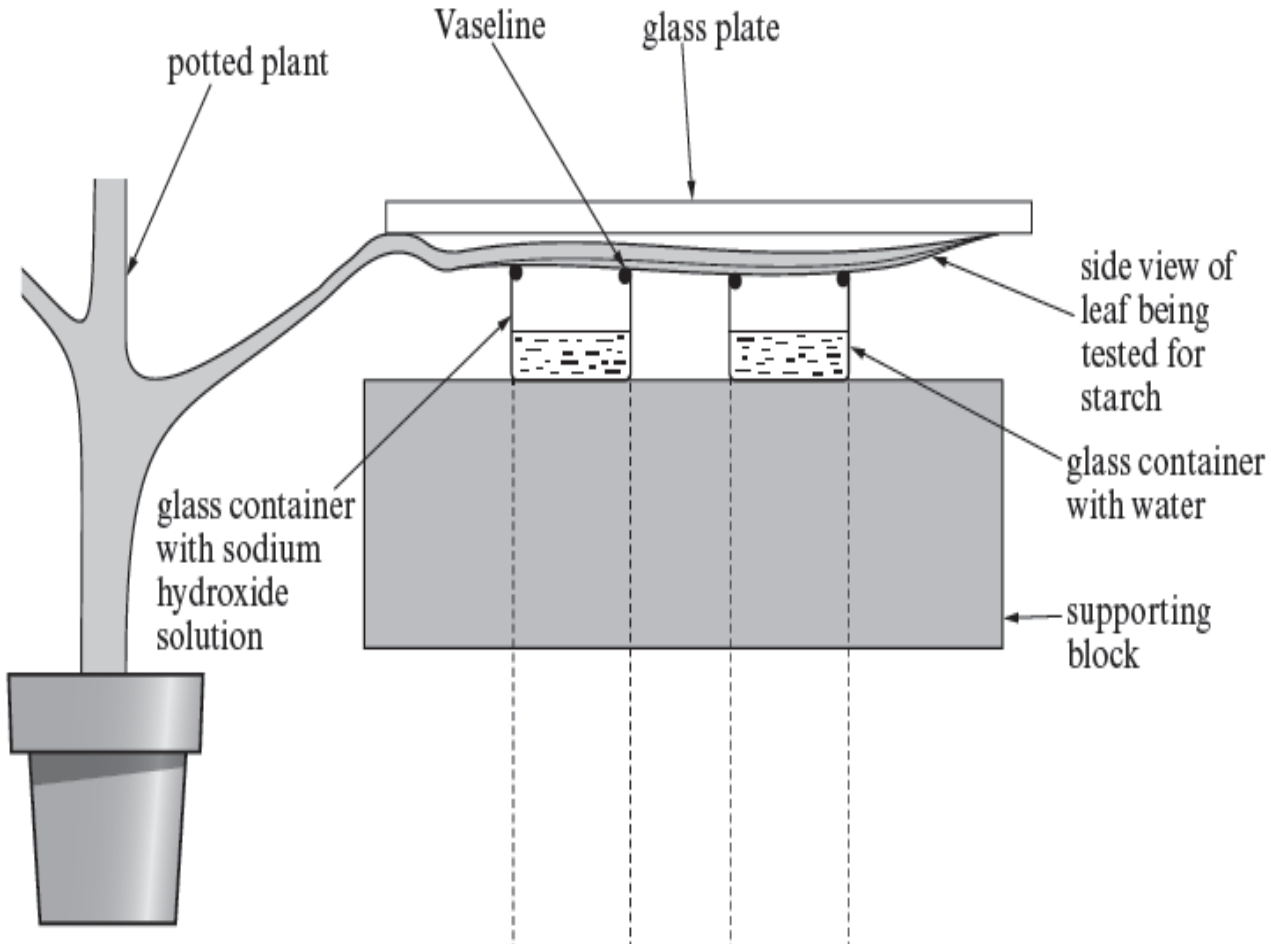
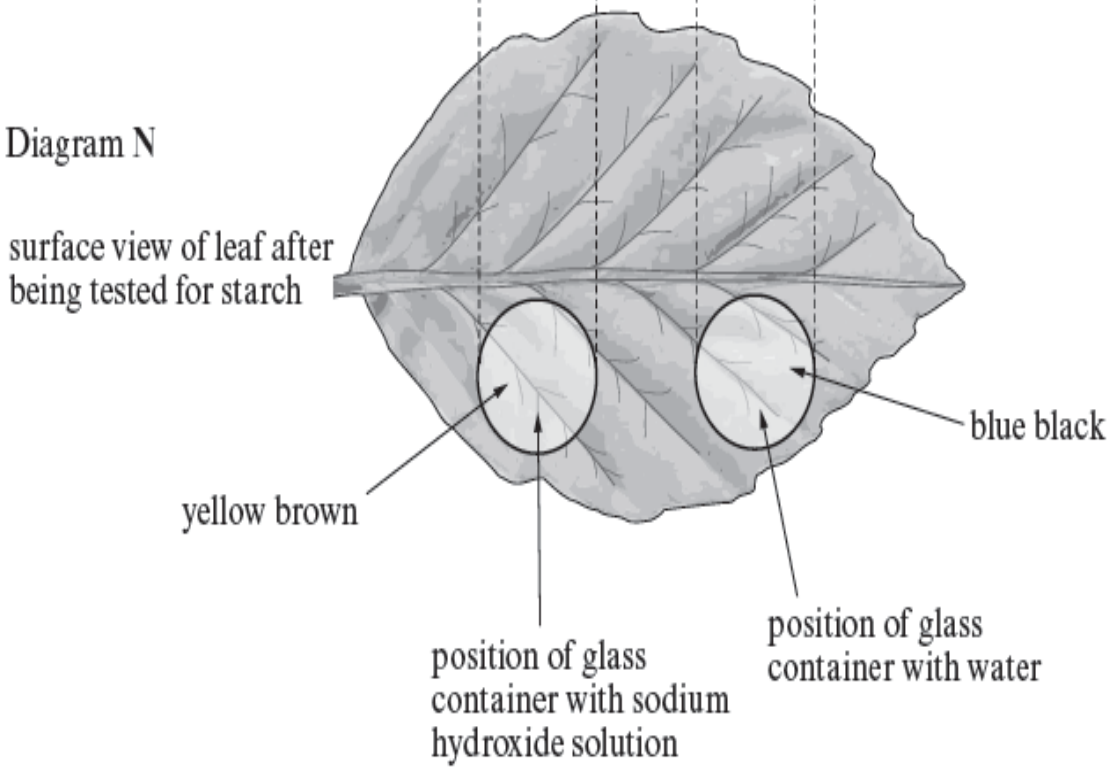


Diagram **N**



(a) State what the investigation shown opposite demonstrates. [1]

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(b) (i) How would you completely remove all the chlorophyll from the leaf before testing for starch? [1]

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(ii) Name the chemical used to test for starch. [1]

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(iii) Explain why part of the leaf in diagram **N** is yellow-brown in colour. [3]

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(c) What was the purpose of the glass container with water? [1]

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(d) Why is it only possible to form a valid conclusion for this investigation if the glass plate and containers allow light through? [1]

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4 Describe the method involved in testing a leaf for the presence of starch.
Each of the stages involved in the method should be described in sequence and the reason for carrying out each stage should be included.
Your description must include reference to the colour changes shown by the leaf and what these changes indicate. [6 QWC]

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