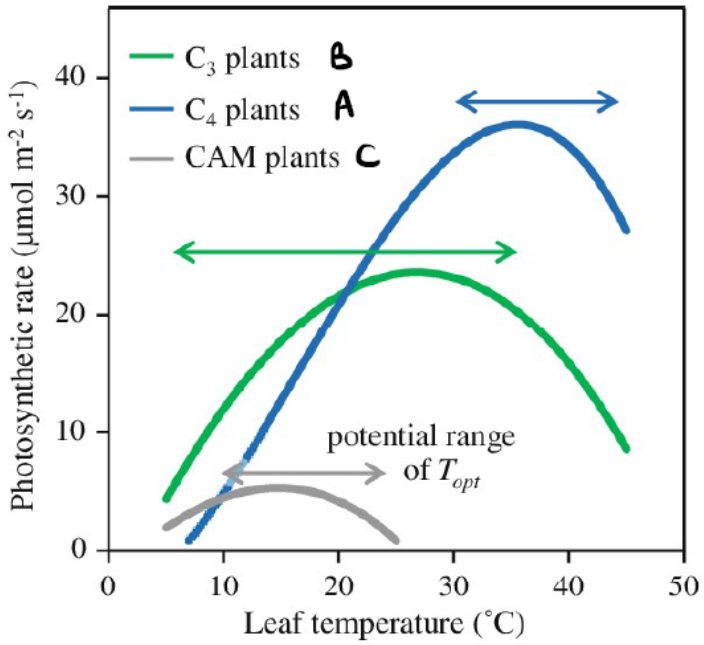
GCSE Biology B (Twenty First Century Science)

J257/03 Breadth in Biology (Higher)

Question Set 27

1 (a) (i) The graph shows how temperature can affect the rate of photosynthesis for three different plant types, **A**, **B** and **C**.



Which **three** conclusions can be drawn from the graph?

Tick (✓) **three** boxes.

All plant types can photosynthesise over the same range of temperatures.

For all plant types, as temperature increases the rate of photosynthesisincreases, peaks and then decreases. ✓

The highest rate of photosynthesis for plant type **B** is at 25 °C.

The highest rate of photosynthesis for plant type **C** and **A** is the same.

The lowest rate of photosynthesis for plant type **C** is at 25 °C. ✓

Plant type **C** is less tolerant of high temperatures. ✓

[3]

(ii) Explain why temperature affects the rate of photosynthesis. **[2]**

Photosynthesis is an enzymatic reaction thus temperature affects the rate of photosynthesis by affecting the enzyme activity.

(When temperature is low enzyme activity is slow leading to low rate of photosynthesis. As temperature increases, the number collisions enzyme can do increases leading to higher rate of photosynthesis until it reaches peak. When the temperature is higher than optimum, the enzyme starts to denature reducing the rate of photosynthesis.)

(b) Describe the **two** main stages of photosynthesis and the role of chloroplasts in this process. **[4]**

The light-dependent reaction occurs in the thylakoid membranes and it involves chlorophyll absorbing light energy and converts it into chemical energy forming ATP and NADPH and O_2 as waste product.

The light-independent reaction (calvin cycle) takes place in the stroma of chloroplast where carbon dioxide is converted to range of products e.g. hexose sugars.

Total Marks for Question Set 27: 9