

**A Level Biology A**  
**H420/01 Biological Processes**

**Question Set 22**

22 (a)

Plants are capable of synthesising a variety of molecules from the products of the light-independent stage of photosynthesis.

Fig 22.1 summarises these processes.

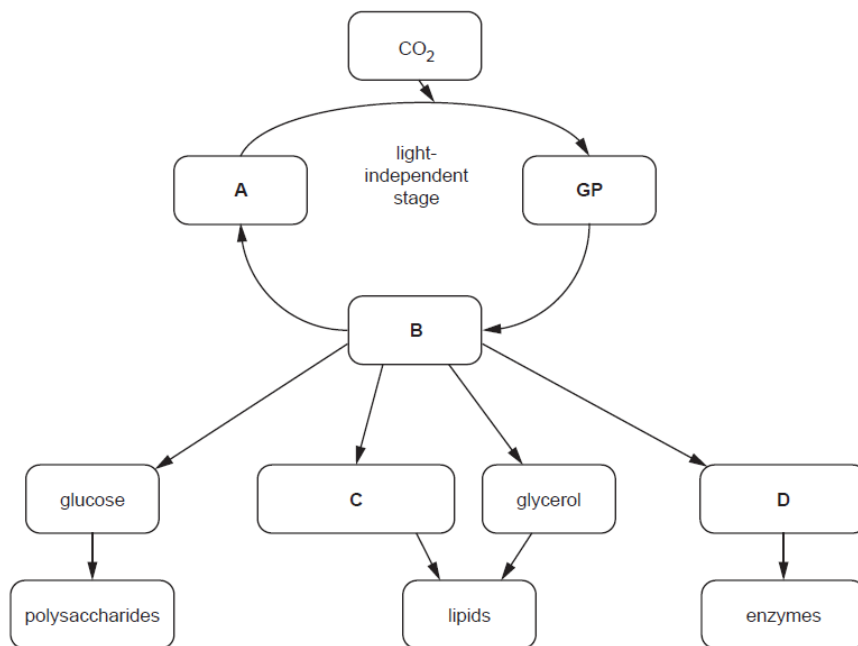


Fig. 22.1

Identify the molecules represented by the letters **A**, **B**, **C** and **D** in Fig. 22.1

**A** .....

**B** .....

**C** .....

**D** .....

[4]

22 (b) (i) A scientist investigated the rate of photosynthesis in lesser pondweed, *Potamogeton pusillus*.

The method used is outlined below:

- Add 200 cm<sup>3</sup> of distilled water to a 300 cm<sup>3</sup> glass beaker.
- Dissolve 5 g of NaHCO<sub>3</sub> in the water to provide an excess of CO<sub>2</sub>.
- Place the beaker in a water bath at 10 °C and leave for 10 min to equilibrate.
- Insert an oxygen sensor into the water in the beaker and measure the baseline O<sub>2</sub> concentration.
- Place 100 g of *P. pusillus* into the beaker.
- Remove all other light sources from the room and place an LED light source 20 cm above the top of the beaker.
- Use a light intensity meter to ensure the light intensity above the beaker is 5000 lux.
- Measure the concentration of oxygen dissolved in the water using a data logger every 10 min for 200 min.
- Carry out four more repeats at 10 °C.
- Repeat all the above steps in water baths at 15 °C, 20 °C, 25 °C and 30 °C.

Identify the following variables from the scientist's method: independent variable

.....

dependent variable

.....

**one** control variable

.....

[3]

22 (b) (ii) Identify **one** variable that was **not** controlled in the scientist's method.

[2]

- 2 (c) A scientist investigated the rate of photosynthesis in lesser pondweed, *Potamogeton pusillus*.

Fig. 22.2 is a graph of the scientist's results.

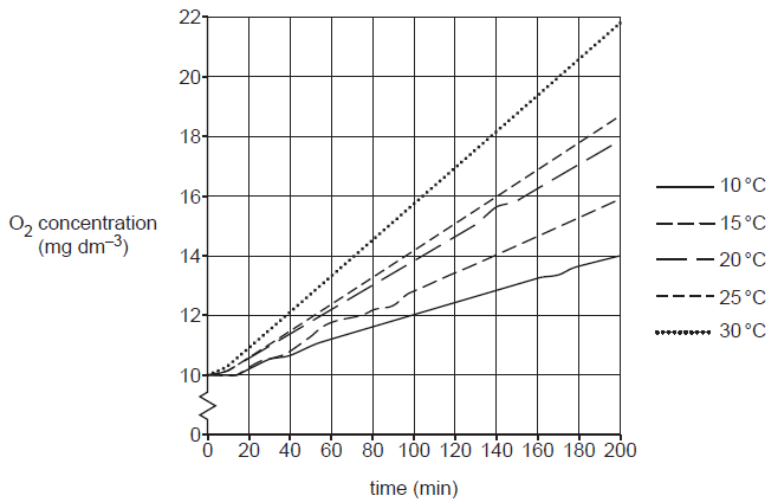


Fig. 22.2

Describe and explain what these results show about photosynthesis in *P. pusillus*. [3]

- 22 (d) (i) The light-independent stage of photosynthesis used to be referred to as the 'dark reaction'.

Explain why this is both an accurate **and** an inaccurate way to describe the light-independent stage.

[2]

- 22 (d) (ii) Name the enzyme responsible for fixing CO<sub>2</sub> in the light-independent stage of photosynthesis.

[1]

- 22 (e) (i) The scientist then investigated the effect of auxin on *P. pusillus* stems.

The growing tips of stems were removed and the stems were placed in solutions containing different concentrations of auxin.

The scientist analysed the results and determined the following relationship:

The higher the concentration of auxin in the solution, the fewer side shoots grew on the *P. pusillus* stems.

Explain why this relationship occurs in *P. pusillus* stems.

[1]

- 22 (e) (ii) Give **two** examples of the commercial uses of auxin.

[2]

**Total Marks for Question Set 22: 17**

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