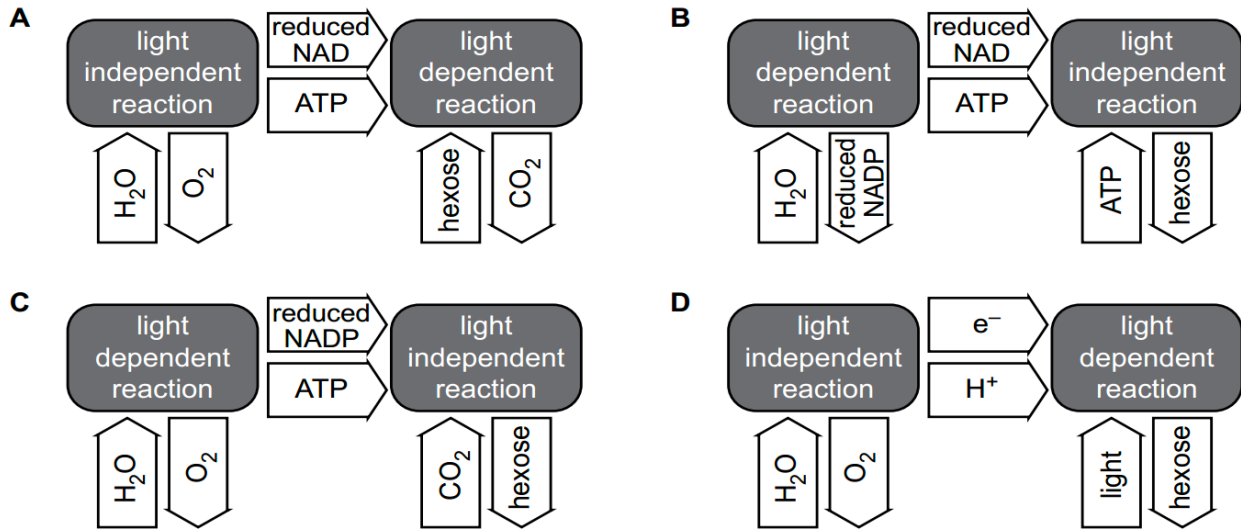




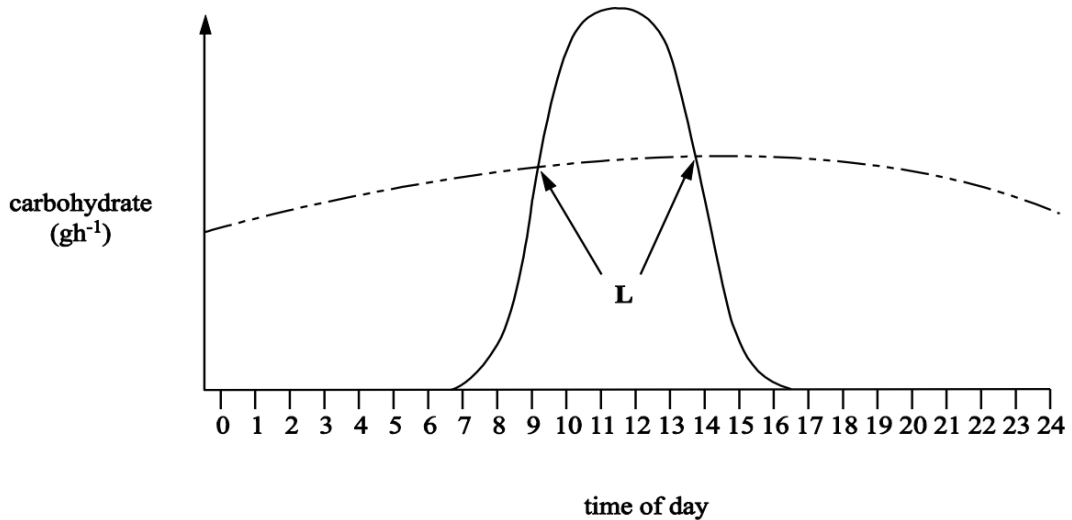
2 Which of the images, **A** to **D**, correctly summarises photosynthesis?



Your answer

[1]

18 (a) Plants photosynthesise and respire. **Fig. 18.1** shows the rate of production of carbohydrate in photosynthesis and the rate of use of carbohydrate by respiration.



Key

- rate of photosynthesis
- - - - - rate of plant respiration

Fig. 18.1

(i) Explain the shape of the curve for the rate of photosynthesis in **Fig. 18.1**.

[2]



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

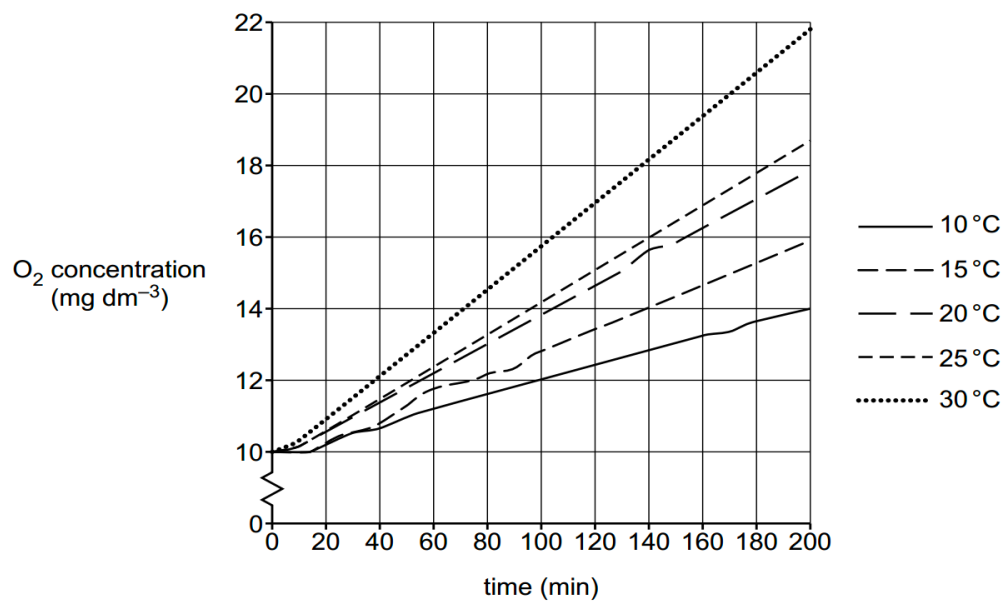


Fig. 22.2

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

[3]



3 Photosynthesis in green plants involves light-dependent reactions and the Calvin cycle.

(a) The Calvin cycle uses the products of the light-dependent reactions.

(i) State the location of the Calvin cycle.

(1)

(ii) Describe the roles of the products of the light-dependent reactions in the Calvin cycle.

(3)

0 3 . **3** Atrazine binds to proteins in the electron transfer chain in chloroplasts of weeds, reducing the transfer of electrons down the chain.

Explain how this reduces the rate of photosynthesis in weeds.

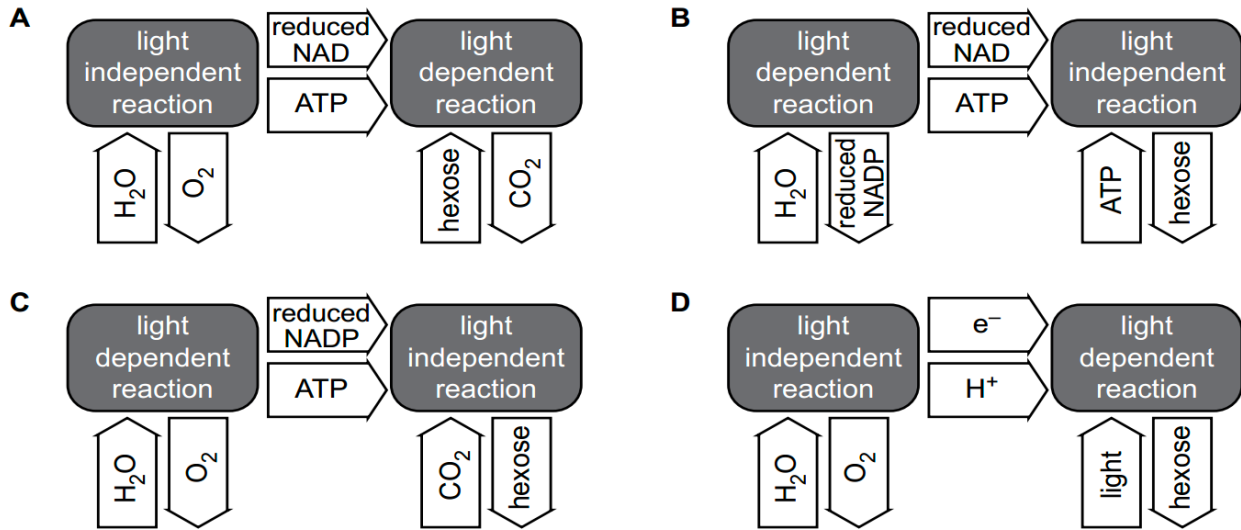
[4 marks]

0 4 . **5** Explain how chemicals which inhibit the decolourisation of DCPIP could slow the growth of weeds.

[2 marks]



2 Which of the images, **A** to **D**, correctly summarises photosynthesis?

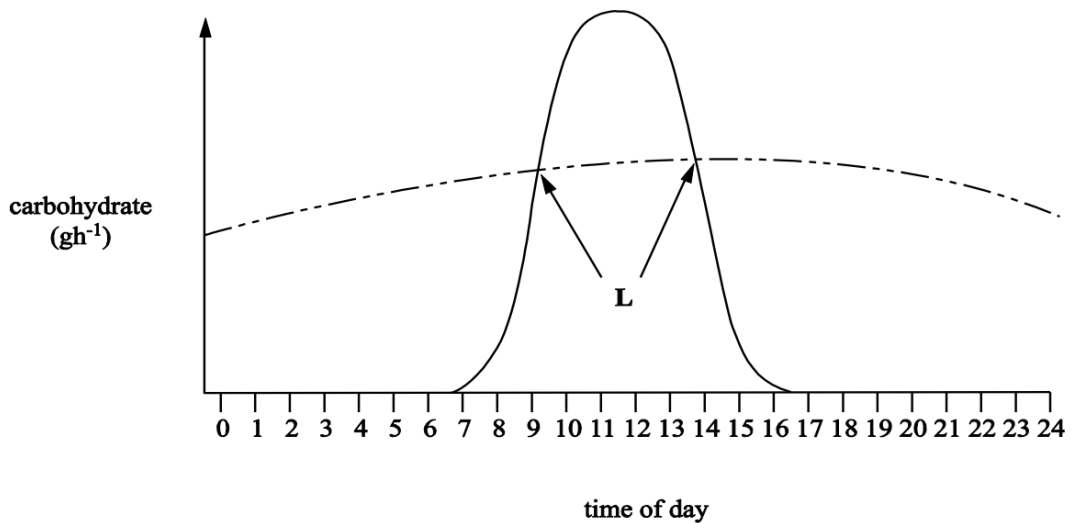


Your answer

C

[1]

18 (a) Plants photosynthesise and respire. **Fig. 18.1** shows the rate of production of carbohydrate in photosynthesis and the rate of use of carbohydrate by respiration.



Key

————— rate of photosynthesis
- - - - - rate of plant respiration

Fig. 18.1

(i) Explain the shape of the curve for the rate of photosynthesis in **Fig. 18.1**.

increased photosynthetic activity during daylight
as light intensity increases there is increased activity of the light dependent reaction

No marks available for describing the shape of the curve.

[2]



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

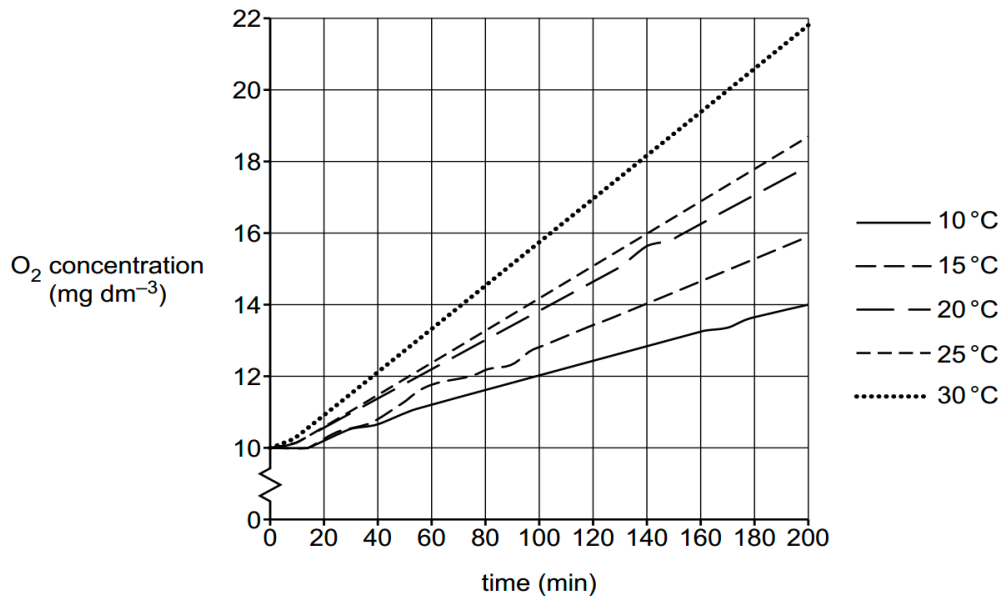


Fig. 22.2

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

descriptions

- D1 increasing temperature increases , O₂ concentration / rate of photosynthesis ✓
- D2 at each temperature rate of , oxygen production / photosynthesis , is constant ✓

explanations

- E1 oxygen is a product of , photosynthesis / photolysis / light-dependent reactions ✓
- E2 temperature acts as a limiting factor ✓
- E3 no other (named) factor was limiting ✓
- E4 increasing temperature increases , kinetic energy of molecules / rate of enzyme reactions ✓

D1 **ALLOW ORA** for decreasing temperature

[3]

2 max for explanations

- E3 **ALLOW** e.g. light intensity / CO₂ concentration
- E4 **ALLOW** e.g. increases , ESC / EPC , formation e.g. increases number of successful collisions **ALLOW KE** for kinetic energy
ALLOW ORA for decreasing temperature



3 Photosynthesis in green plants involves light-dependent reactions and the Calvin cycle.

(a) The Calvin cycle uses the products of the light-dependent reactions.

(i) State the location of the Calvin cycle.

An answer that makes reference to the following:

(1)

1. stroma of the chloroplast (1)

(ii) Describe the roles of the products of the light-dependent reactions in the Calvin cycle.

(3)

An answer that makes reference to the following:

1. (the products) ATP and reduced NADP (1)
2. ATP is used (by the enzyme) converting {GP to GALP / GALP to RuBP} (1)
3. reduced NADP used to convert GP to GALP (1)

1. **ALLOW** NADPH₂ or NADPH for reduced NADP
IGNORE NADPH⁺ and reduced NAD
2. **ALLOW** ATP is used to provide energy for the Calvin cycle

0 3 . **3**

Atrazine binds to proteins in the electron transfer chain in chloroplasts of weeds, reducing the transfer of electrons down the chain.

Explain how this reduces the rate of photosynthesis in weeds.

[4 marks]

1. Reduced transfer of protons across thylakoid membrane
OR
Reduced chemiosmotic gradient/proton gradient across thylakoid membrane;
2. (So) less ATP produced;
3. (So) less reduced NADP produced;
4. (So) light-independent reaction slows/stops
OR
Less reduction of GP to triose phosphate;

3. Accept NADPH / NADPH₂ / NADPH⁺
3. Reject reduced NAD

0 4 . **5**

Explain how chemicals which inhibit the decolourisation of DCPIP could slow the growth of weeds.

[2 marks]

1. Less/no ATP produced;
2. Less/no reduced NADP produced;
3. Less/no GP reduced/converted to TP;

- 2, Accept: less/no NADPH/NADPH₂/NADPH + H