

2.8 Photosynthesis

Question Paper

Course	DP IB Biology
Section	2. Molecular Biology
Topic	2.8 Photosynthesis
Difficulty	Hard

Time allowed: 10
Score: /5
Percentage: /100

Question 1

Which of the following statements relating to photosynthesis are correct?

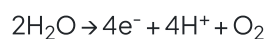
- I. Temperature is a limiting factor of photosynthesis.
- II. Chlorophyll absorbs wavelengths of light at either end of the visible light spectrum.
- III. Plants have a positive net carbon dioxide uptake.
- IV. The only photoautotrophic organisms include plants and algae.

- A. I, II, III, and IV.
- B. II, and III.
- C. I, II, and III.
- D. I, and II.

[1 mark]

Question 2

During photosynthesis, the following reaction occurs.



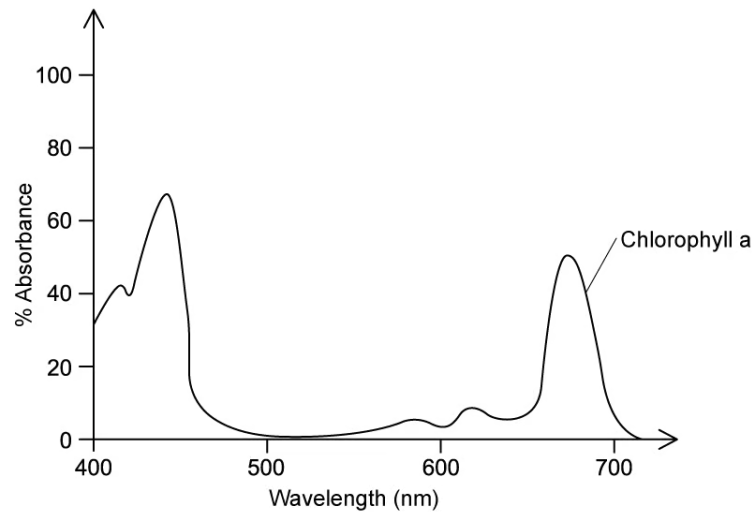
Which of the following statements relating to this reaction is **not** correct?

- A. All of the oxygen derived from the splitting of water is used for cellular respiration
- B. Water is broken down using energy derived from light
- C. The splitting of water is an essential step in photosynthesis
- D. Electrons derived from the splitting of water are used in subsequent stages of photosynthesis

[1 mark]

Question 3

The graph shows the absorption spectra for chlorophyll a.



Which of the following statements, relating to the absorption spectra for chlorophyll and the action spectrum of photosynthesis for green plants, are correct?

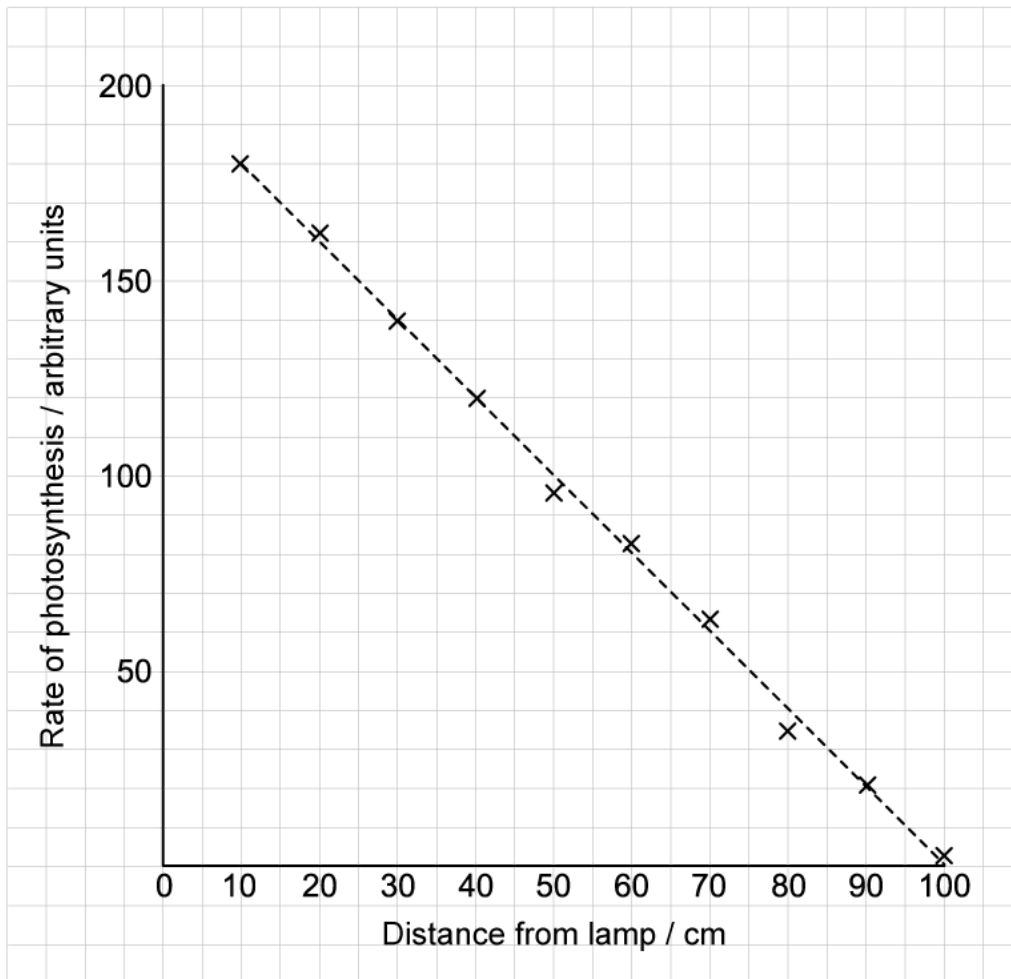
- I. The absorption spectra of chlorophyll pigments are obtained by measuring their absorption of indigo, violet, blue, green, yellow, orange and red light, whereas the action spectrum of chlorophyll is the wavelengths of light that bring about photosynthesis.
- II. The absorption spectra for chlorophyll and the action spectrum of photosynthesis are both plotted using % absorbance on the Y-axis.
- III. The absorption spectra for chlorophyll and the action spectrum of photosynthesis both display two main peaks, including a larger peak in the red region (~450 nm) and a smaller peak in the blue region (~670 nm).
- IV. The absorption spectrum of chlorophyll displays a trough in the green/yellow portion of the visible spectra (~550 nm), whereas the action spectrum of photosynthesis does not.

- A. I only
- B. I and III
- C. I, II, and III
- D. II, III and IV

[1 mark]

Question 4

A student investigated the effect of light intensity on the rate of photosynthesis by counting the number of bubbles released from the pondweed *Elodea canadensis*. The results are shown below.



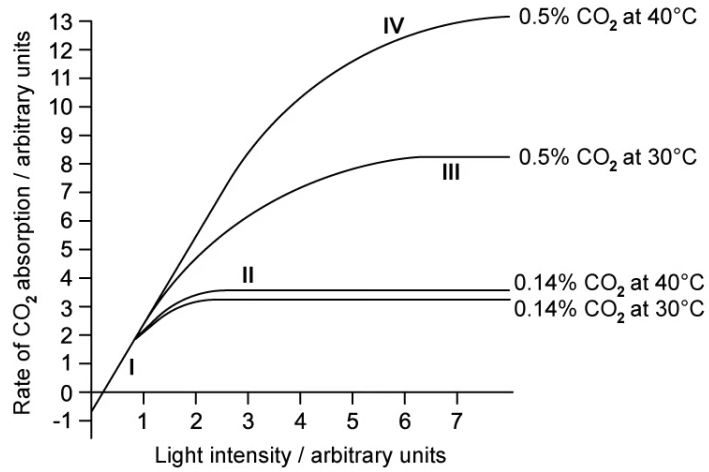
Which of the following statements relating to the utilisation of carbon dioxide at differing light intensities are correct?

- I. The rate of carbon dioxide uptake always increases proportionately as light intensity increases.
 - II. The rate of carbon dioxide uptake will decrease as the plant is moved away from the lamp.
 - III. The rate of carbon dioxide uptake will be greater at increased light intensities.
 - IV. The rate of carbon dioxide uptake becomes constant at increased light intensities as carbon dioxide becomes a limiting factor.
- A. I, II, III, and IV.
 B. I, and II.
 C. II, and III.
 D. II, III, and IV.

[1 mark]

Question 5

The graph below shows how varying light intensity affects the rate of carbon dioxide absorption by leaves, at different, fixed temperatures and carbon dioxide concentrations.



Which of the following rows correctly identifies the possible limiting factor for photosynthesis at I, II, III and IV?

	I	II	III	IV
A.	CO ₂ concentration	Light intensity	Temperature	Photosynthetic capacity
B.	Light intensity	Temperature	CO ₂ concentration	Photosynthetic capacity
C.	Temperature	Light intensity	Photosynthetic capacity	CO ₂ concentration
D.	Light intensity	CO ₂ concentration	Temperature	Photosynthetic capacity

[1 mark]