8.3 Photosynthesis

Question Paper

Course	DP IB Biology
Section	8. Metabolism, Cell Respiration & Photosynthesis (HL Only)
Topic	8.3 Photosynthesis
Difficulty	Easy

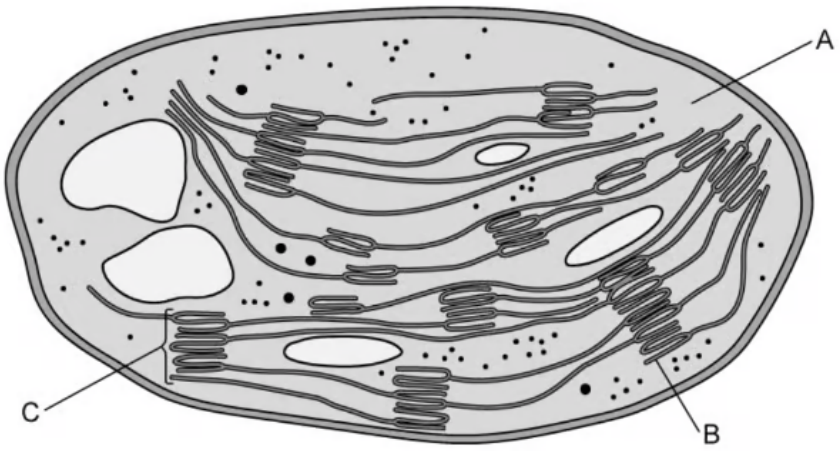
Time allowed: 60

Score: /42

Percentage: /100

Question 1a

a)
The diagram below shows a chloroplast.



Identify Structure A and state the reaction that takes place there.

[2 marks]

[2 marks]

Question 1b

b)
State two products of the light independent stage of photosynthesis.

[2 marks]

[2 marks]

Question 1c

c)
ATP is required to drive the light independent reactions of photosynthesis.

Name the process which produces this ATP to be used in the light independent reactions?

[1 mark]

[1 mark]

Question 1d

d)
The light independent reactions are affected by temperature changes. Lowing the temperature slows down the light independent reactions.

Explain why a low temperature slows down the light independent reactions.

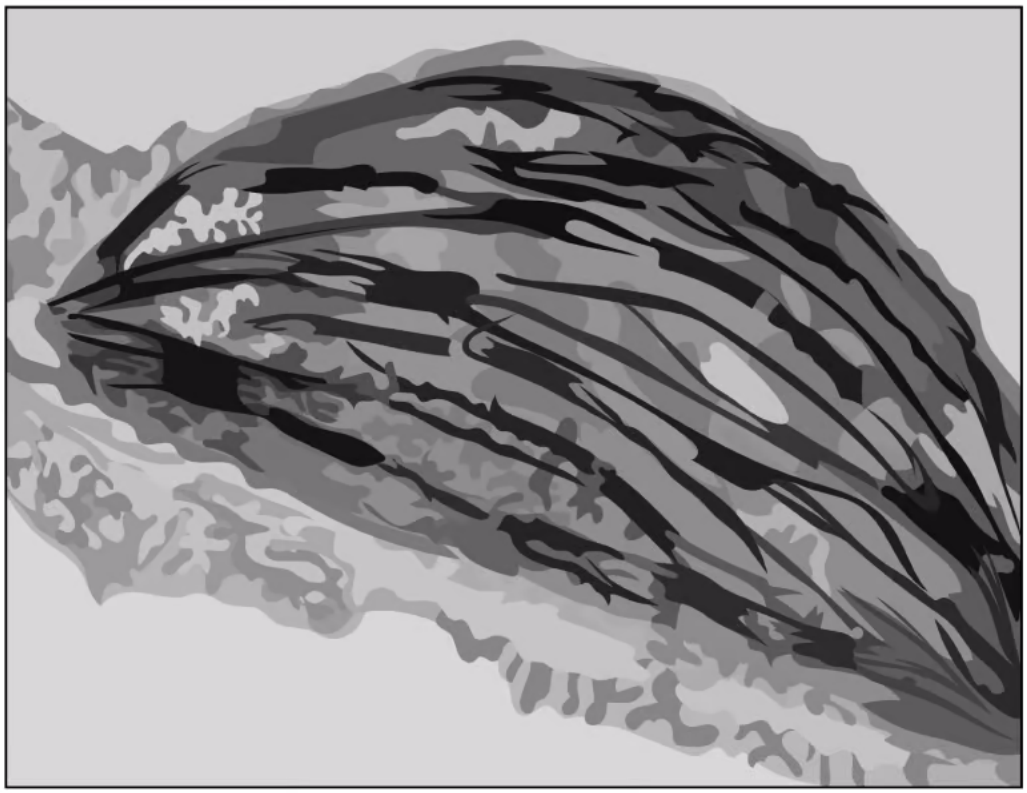
[2 marks]

[2 marks]

Question 2a

a)
The diagram shows an electron micrograph of a chloroplast.

Annotate the diagram with the letter X to show the location of the light dependent stages of photosynthesis.



[1 mark]

[1 mark]

Question 2b

b)
The photolysis of water is an important part of the process of light dependent stages of photosynthesis.

Describe what happens in the photolysis of water.

[2 marks]

[2 marks]

Question 2c

c)
Chloroplasts contain more than one photosynthetic pigment.

Suggest why chloroplasts contain more than one photosynthetic pigment.

[1 mark]

[1 mark]

Question 2d

d)
Describe a structure of the chloroplast that enables maximum absorption of light.

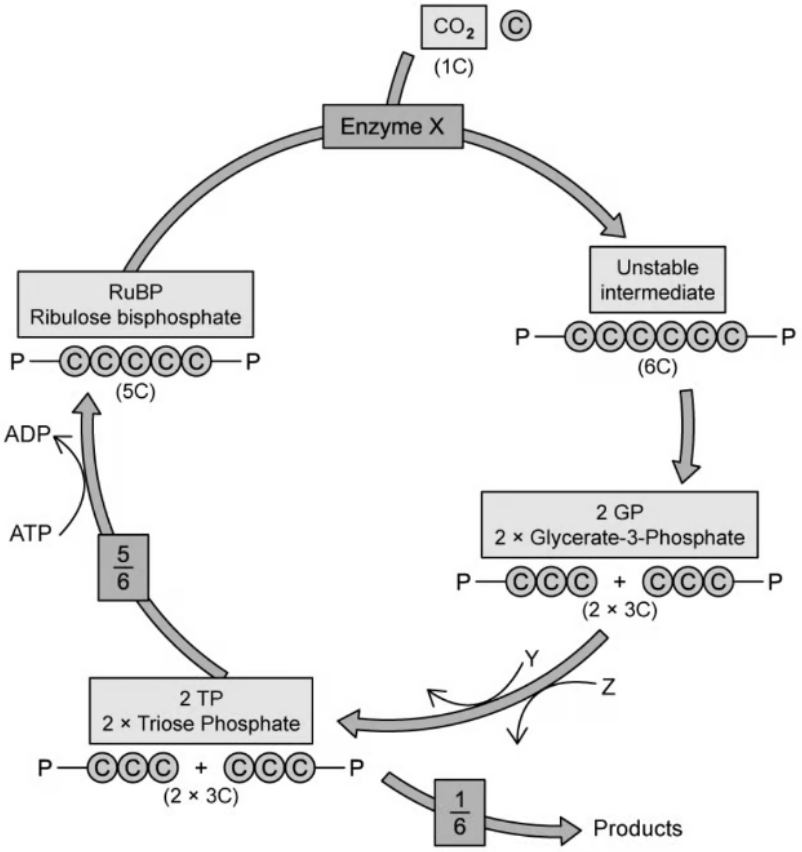
[2 marks]

[2 marks]

Question 3a

a)
The diagram below shows the Calvin cycle.

State the name of enzyme X shown in the diagram.



[1 mark]

[1 mark]

Question 3b

b)
The molecules labelled Y and Z on the diagram are used to convert GP to TP.

Identify the molecules labelled Y and Z.

[2 marks]

[2 marks]

Question 3c

c)
One sixth of the TP is converted into usable products for the plant. One of these is hexose sugars.

State **two** uses of hexose sugars by plant cells.

[2 marks]

[2 marks]

Question 3d

d)
One sixth of TP is converted into usable products for the plant. The remaining five sixths remain in the Calvin cycle.

Explain why it is important that not all the TP is converted to usable products.

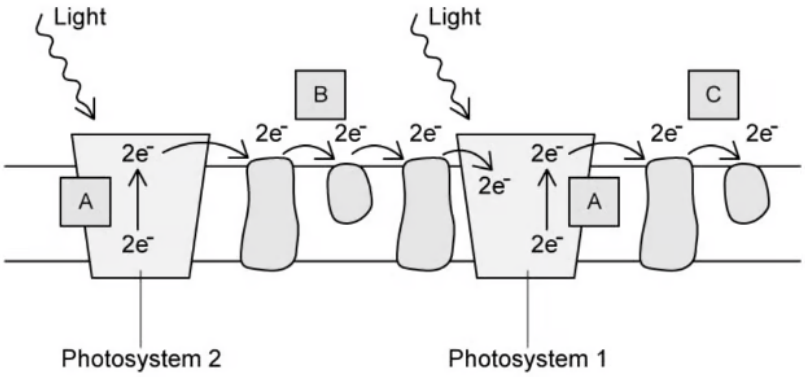
[2 marks]

[2 marks]

Question 4a

a)
The diagram below shows some of the reactions taking place in the light dependent stages of photosynthesis.

State the exact location of the reactions shown.



[1 mark]

[1 mark]

Question 4b

b)
Describe the process that occurs at location A in the diagram.

[2 marks]

[2 marks]

Question 4c

c)
The diagram from part **a)** shows the electron transport chain in the light dependent reaction.

At stage **B,** the electrons are involved in a series of reactions fundamental in the process of chemiosmosis.

State the type of reactions that take place at stage **B.**

[1 mark]

[1 mark]

Question 4d

d)
The diagram from part a) shows the movement of electrons through the electron transport chain.

i)
Identify the product labelled C.

[1 mark]

ii)
Describe the role of the electrons in the formation of product C.

[2 marks]

[3 marks]

Question 5a

One mark is available for clarity of communication throughout this question.

a)
During the light independent stage of photosynthesis, carbon dioxide is converted into organic substances.

Describe how.

[6 marks]

[6 marks]

Question 5b

b)
Outline the experiments preformed by Melvin Calvin to elucidate the pathways of carbon fixation.

[6 marks]

[6 marks]

Question 5c

c)
ATP and NADPH are two products of the light-dependent reactions.

Describe the functions of each of these substances in the light-independent reactions.

[3 marks]

[3 marks]