AQA GCSE BIOLOGY (HIGHER) · 8461

BIOLOGY



EXAM QUESTION PACK

4.4.1 PHOTOSYNTHESIS (PACK 3)

SCORE	PERCENTAGE
/77	%

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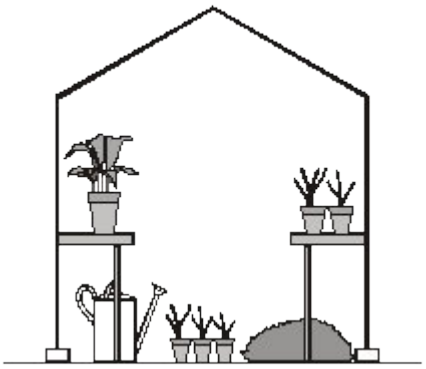
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Q1.

The diagram shows some plants growing in a greenhouse on a hot summer's day.



Which **one** of the following factors is most likely to limit the rate of photosynthesis at this time?

- carbon dioxide concentration
- light intensity
- temperature

Factor _____

Explain the reason for your answer.

_____

_____

_____

_____

_____

_____

(Total 4 marks)

Q2.

Carnation plants have attractive flowers.

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(a) Carnation plants are grown from cuttings.

Complete the sentences by using the correct words from the box.

asexual	clones	genes	mutation	sexual

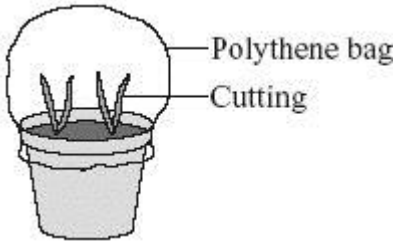
Carnations grown from cuttings have the same _____ as their parents.

This type of reproduction is _____ .

The new plants are known as _____ .

(3)

(b) Gardeners usually cover the cuttings with a polythene bag as shown in the diagram below.



Why do the cuttings grow better if gardeners do this?

_____

_____

(1)

(Total 4 marks)

Q3.

Nitrate fertilisers are important in agriculture. They help to increase crop yields and so make food cheaper to buy. Some of the nitrate fertilisers run off into rivers and get into drinking water. The problem is that the nitrates can react with iron in our blood. This reduces the blood's ability to carry oxygen. If the amount of nitrate in drinking water is too high, it can cause 'blue baby syndrome', in which babies look blue due to lack of oxygen.

The table shows the amount of nitrate fertilisers used and the crop yield.

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Nitrate fertilisers in kilograms per hectare of land	0	150	250
Crop yield in tonnes per hectare of land	5	8	7

Use the information above to suggest what should be done, by farmers and government, to prevent 'blue baby syndrome'. Explain the reasons for your suggestions.

_____

_____

_____

_____

_____

_____

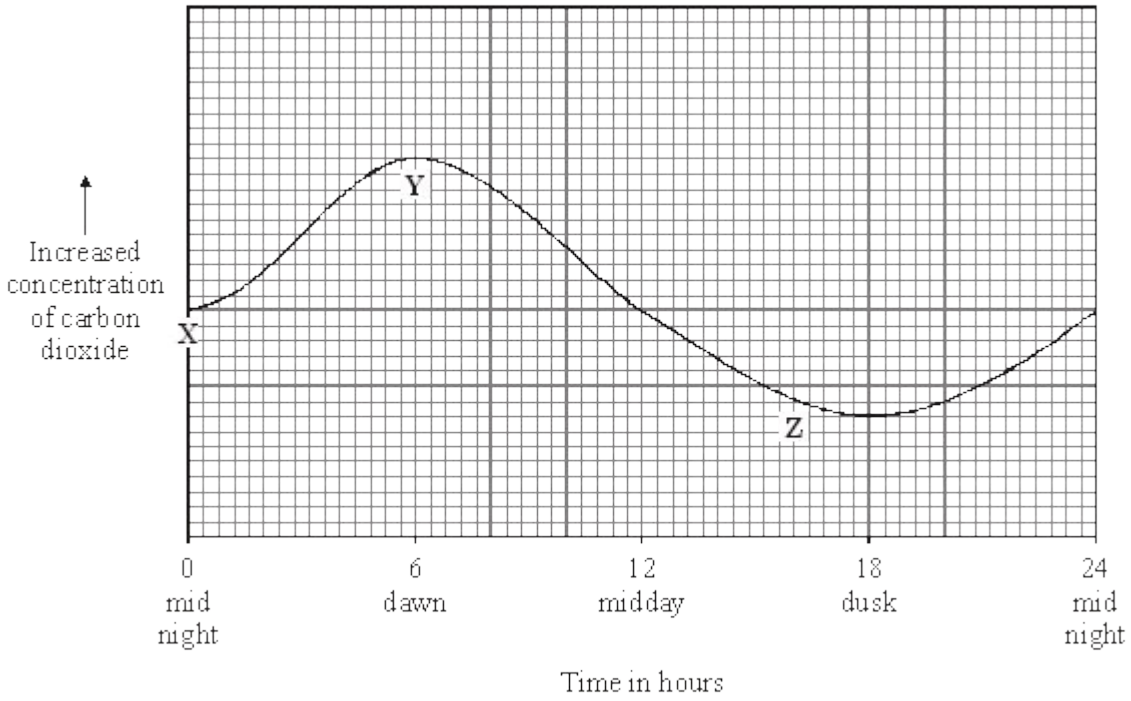
_____

_____

(Total 3 marks)

Q4.

The graph shows the concentration of carbon dioxide in the air in a greenhouse full of tomato plants, measured over a period of 24 hours.



(a) Explain why the concentration of carbon dioxide in the air in the greenhouse increased between **X** and **Y**.

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_____

_____

_____

_____

(2)

(b) Explain why the concentration of carbon dioxide in the air in the greenhouse decreased between **Y** and **Z**.

_____

_____

_____

_____

(2)

(Total 4 marks)

Q5.

(a) Balance the following equation for photosynthesis.

_____ CO_2 + _____ H_2O → $C_6H_{12}O_6$ + _____ O_2

(1)

(b) Give **two** conditions necessary for photosynthesis apart from a suitable temperature range and the availability of water and carbon dioxide.

1. _____

2. _____

(2)

(a) Plants have leaves which contain guard cells and palisade cells. Explain how **each** of these kinds of cell assists photosynthesis.

Guard cells _____

_____

_____

_____

(2)

Palisade cells _____

_____

_____

_____

(2)

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(d) Glucose is a product of photosynthesis. Give **three** uses which green plants make of glucose.

1. _____

2. _____

3. _____

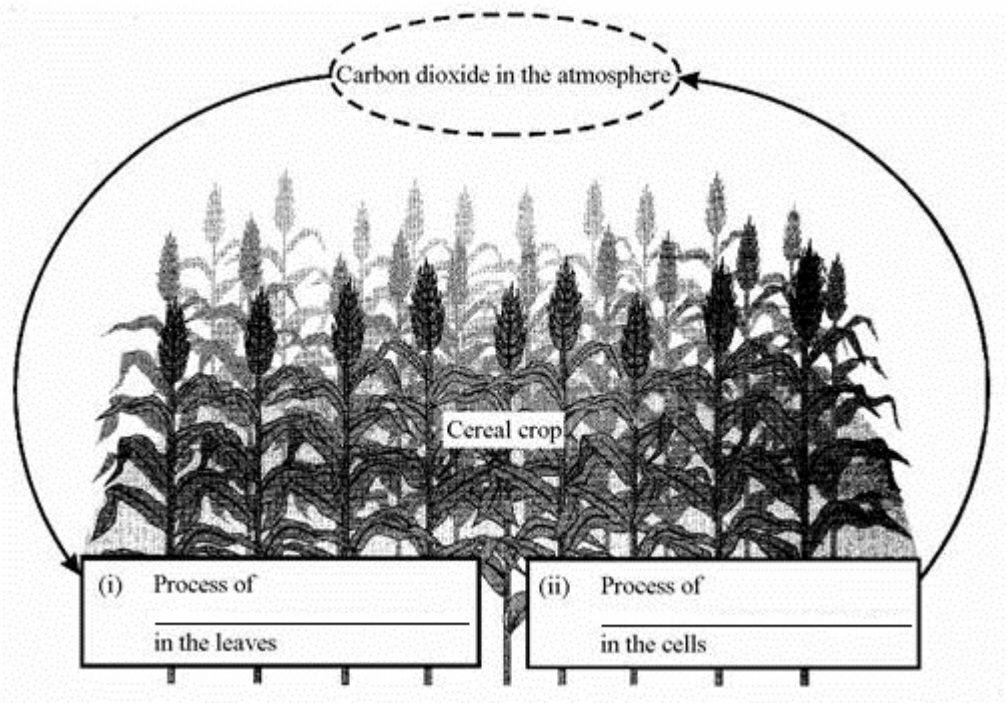
(3)

(Total 10 marks)

Q6.

(a) The diagram shows a cereal crop.

Complete spaces (i) and (ii).



(2)

(iii) What sort of weather may cause the cereal crop to wilt?

_____

(1)

(b) Describe the process of transpiration in plants.

_____

_____

_____

_____

_____

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_____

(3)

(Total 6 marks)

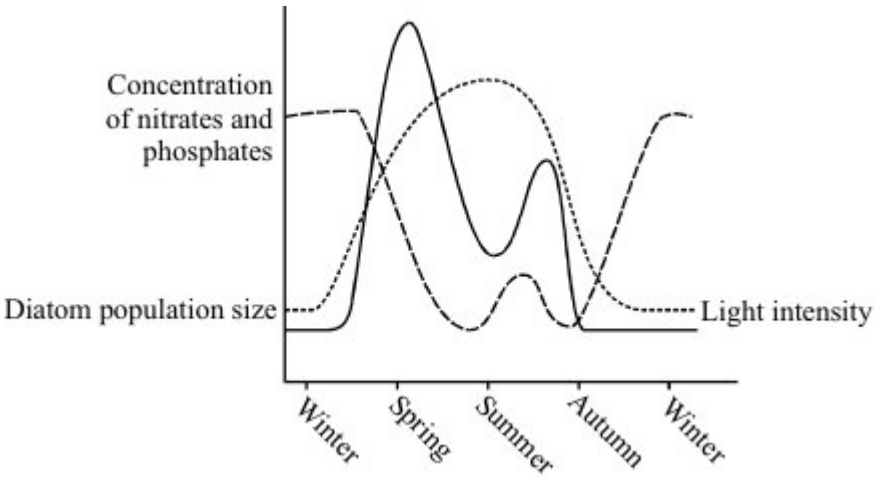
Q7.

A food chain in the North Atlantic Ocean is:

diatoms → small fish → large fish

The graphs show how over a year:

- the population size of diatoms in the North Atlantic varies;
- the light intensity alters;
- the concentration of nitrate and phosphate minerals alters.



(a) Explain why the light intensity is a major factor in controlling the numbers of diatoms.

_____

_____

_____

(2)

(b) (i) Suggest **two** reasons why the population of diatoms decreases between spring and summer.

1. _____

_____

2. _____

_____

(2)

(ii) Give **two** reasons why the population of diatoms decreases in autumn.

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1. _____

_____

2. _____

_____

(2)

(c) Use the information on the graph to suggest what change causes the number of diatoms to increase in the late summer. Give a reason for the change.

_____

_____

_____

(2)

(Total 8 marks)

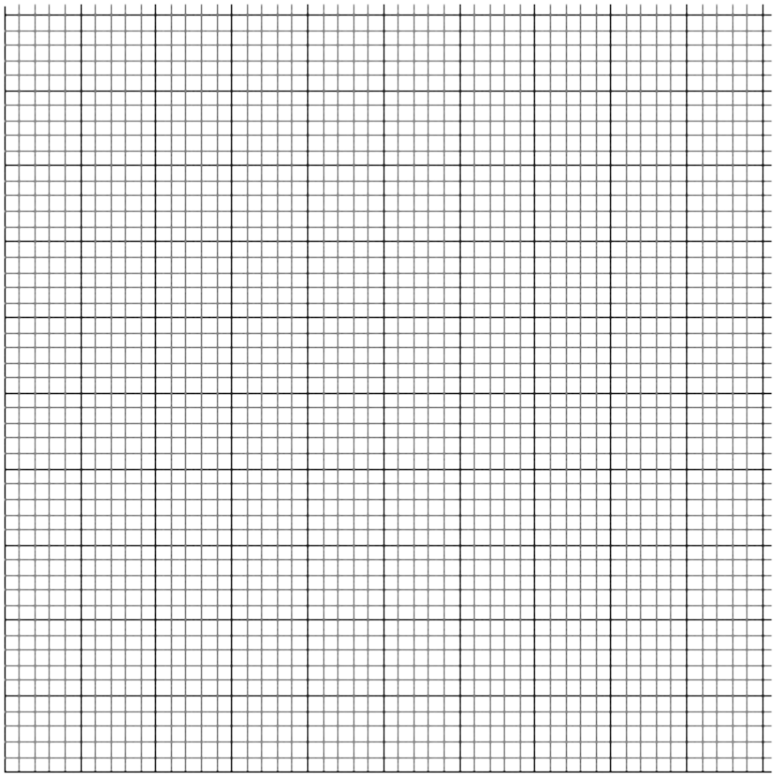
Q8.

The figures below show how the yield of a wheat crop is affected by adding nitrogen fertiliser.

Nitrogen fertiliser added (kg/hectare)	Yield (tonnes/hectare)
0	26
50	28
75	31
100	34
125	40
150	43
175	44
200	44

(a) Display these results on the graph paper in the most suitable way.

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(4)

(b) What conclusions can you draw from the graph?

_____

_____

_____

_____

_____

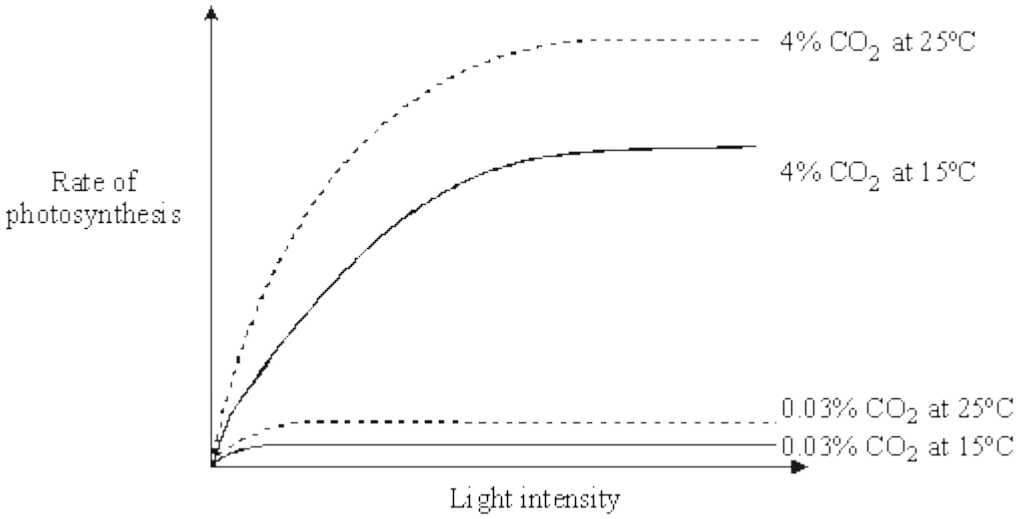
(3)

(Total 7 marks)

Q9.

The graph shows how the rate of photosynthesis is affected by different conditions.

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(a) What patterns can you find from this graph?

_____

_____

_____

_____

_____

(5)

(b) How useful could this information be to a grower using glasshouses? Give reasons for your answer.

_____

_____

_____

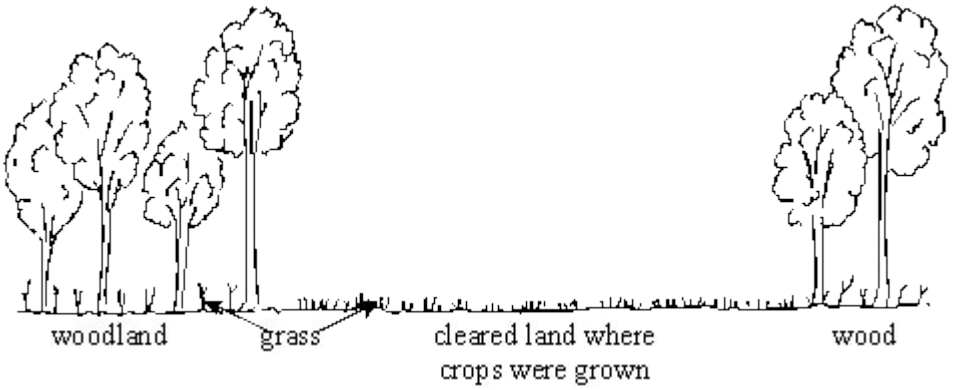
(2)

(Total 7 marks)

Q10.

In some developing countries woodland is cut down and burned. The ash acts as fertiliser. Crops are grown for three years. The land is then left as it is too poor to grow any more crops.

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(a) In the original woodland trees and plants died and grew for hundreds of years. When cleared the land grew crops for only three years. Explain this difference in as much detail as you can.

_____

_____

_____

_____

(3)

(b) What could farmers do to make crops grow on the cleared land for more than three years?

_____

_____

(2)

(Total 5 marks)

Q11.

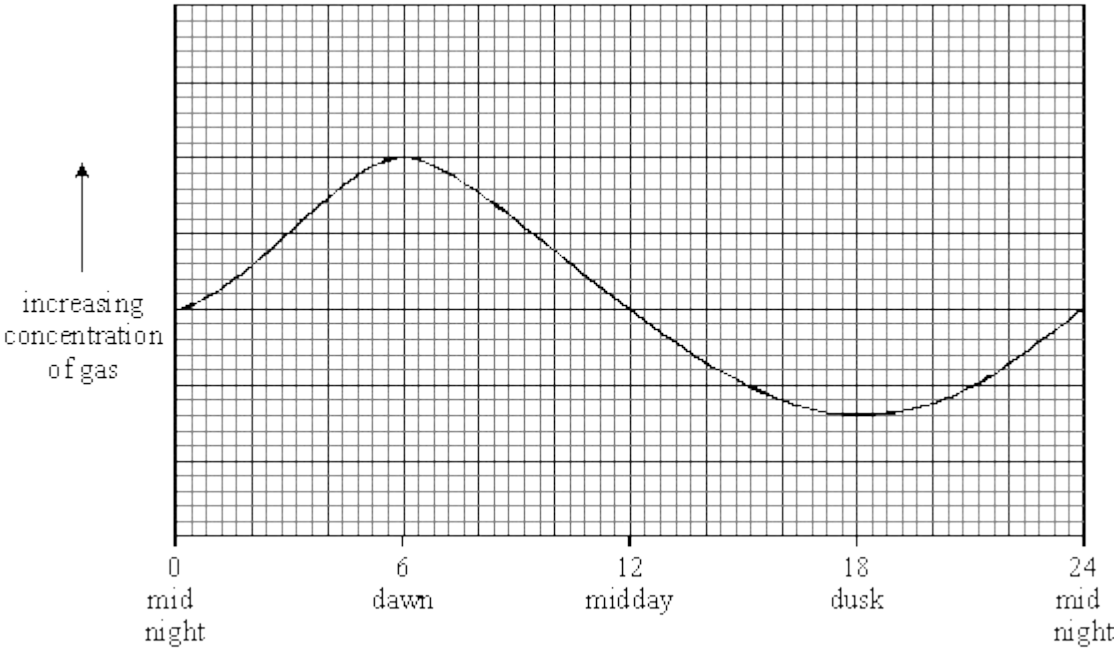
Plants produce glucose by a process called photosynthesis.

$$\text{carbon dioxide + water} \xrightarrow[\text{chlorophyll}]{\text{light}} \text{oxygen + glucose}$$

The plant uses glucose to grow.

(a) The graph shows the change in concentration of carbon dioxide in a glasshouse full of plants over 24 hours.

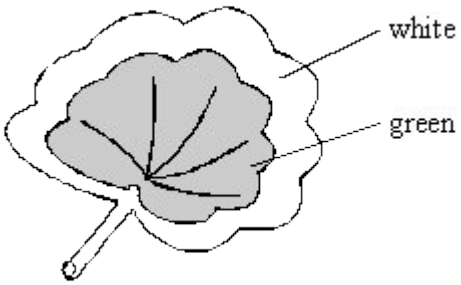
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Draw a line on the graph to show how the concentration of oxygen changes in the glasshouse.

(3)

(b)



Some plants have variegated leaves with white parts which contain no chlorophyll.

How do you think a variegated geranium would grow compared to a similar sized geranium with all green leaves?

Explain your answer _____

_____

_____

(2)

(Total 5 marks)

Q12.

Plants are grown in glasshouses to protect them from the weather or extend the growing season.

Plants make food by photosynthesis.

$6CO_2 + 6H_2O$ energy from $C_6H_{12}O_6 + 6O_2$

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light glucose

In winter, when days are shorter, glasshouses are heated to keep the enzyme reactions in plants at optimum rates.

What else should a grower do to make sure that the plants are photosynthesising at the optimum rate? Give a reason for your answer.

_____

_____

_____

_____

_____

_____

(Total 3 marks)

Q13.

The table below shows a wheat farmer's calendar.

October	Winter Wheat is sown and germinates. Phosphate/potash fertiliser is applied.
March	Wheat plants resume growth. Nitrate fertiliser is applied.
April	Ammonium nitrate, the main fertiliser, is applied. Fungicide may be sprayed to control mildew or rust on wheat.
May	Extra ammonium nitrate fertiliser may be applied. A second spraying of fungicide may be needed. Dwarfing hormone sprayed to keep wheat straw (stalks) short.
June	Insecticide spray against aphids may be needed. Extra spraying of fungicide may be needed.
August	Wheat is harvested.
August/ September	Ground sprayed with weedkiller. Stubble (remains of wheat plants) is ploughed in ready for the next crop.

This process uses expensive fertilisers and pesticides to grow pest free crops which may be produced in excess.

What are the reasons for and against growing wheat in this way?

For _____

_____

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_____

(3)

Against _____

_____

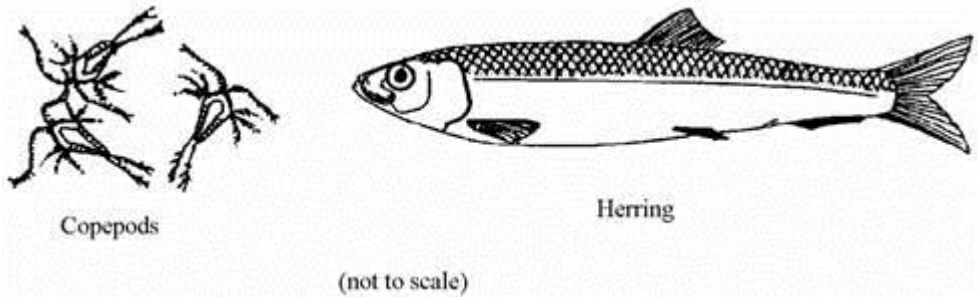
_____

(4)

(Total 7 marks)

Q14.

Copepods are tiny animals which live in the sea.



During the day they live deep down near the sea bed.
At night they move up to the surface where they feed on tiny plants.
When the sun rises they move down to the bottom again.

(a) Suggest why the tiny **plants** live near the surface of the sea.

_____

_____

(2)

(b) Herring feed on copepods.

Where will herring be found during the day? Give a reason for your answer.

_____

_____

_____

(2)

(Total 4 marks)

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