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7402454380

MARINE SCIENCE **0697/22**

Paper 2 Theory and Practical Skills **October/November 2025**

1 hour 45 minutes

You must answer on the question paper.

No additional materials are needed.

INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You may use a calculator.
- You should show all your working and use appropriate units.

INFORMATION

- The total mark for this paper is 80.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **20** pages. Any blank pages are indicated.

1 Fig. 1.1 shows a map of the world.

Fig. 1.1

(a) (i) Give the name of the region shown on the map between the latitudes X and Y.

..... [1]

(ii) State what is meant by the term World Ocean.

.....

..... [1]

(b) Fig. 1.2 shows a map of part of the Atlantic Ocean. Ascension Island and St Helena are islands positioned close to the mid-Atlantic Ridge.

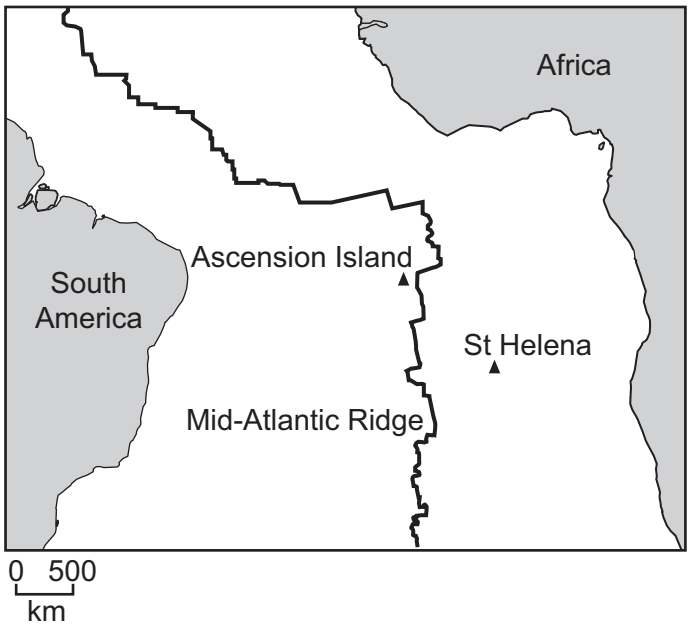

Fig. 1.2

Earthquakes are often felt on both islands.

Explain why the distance between Ascension Island and St Helena is slowly increasing.

Use Fig. 1.2 to support your answer.

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..... [3]

(c) The shores of Ascension Island are tidal. Fig. 1.3 shows the tidal cycle for one day.

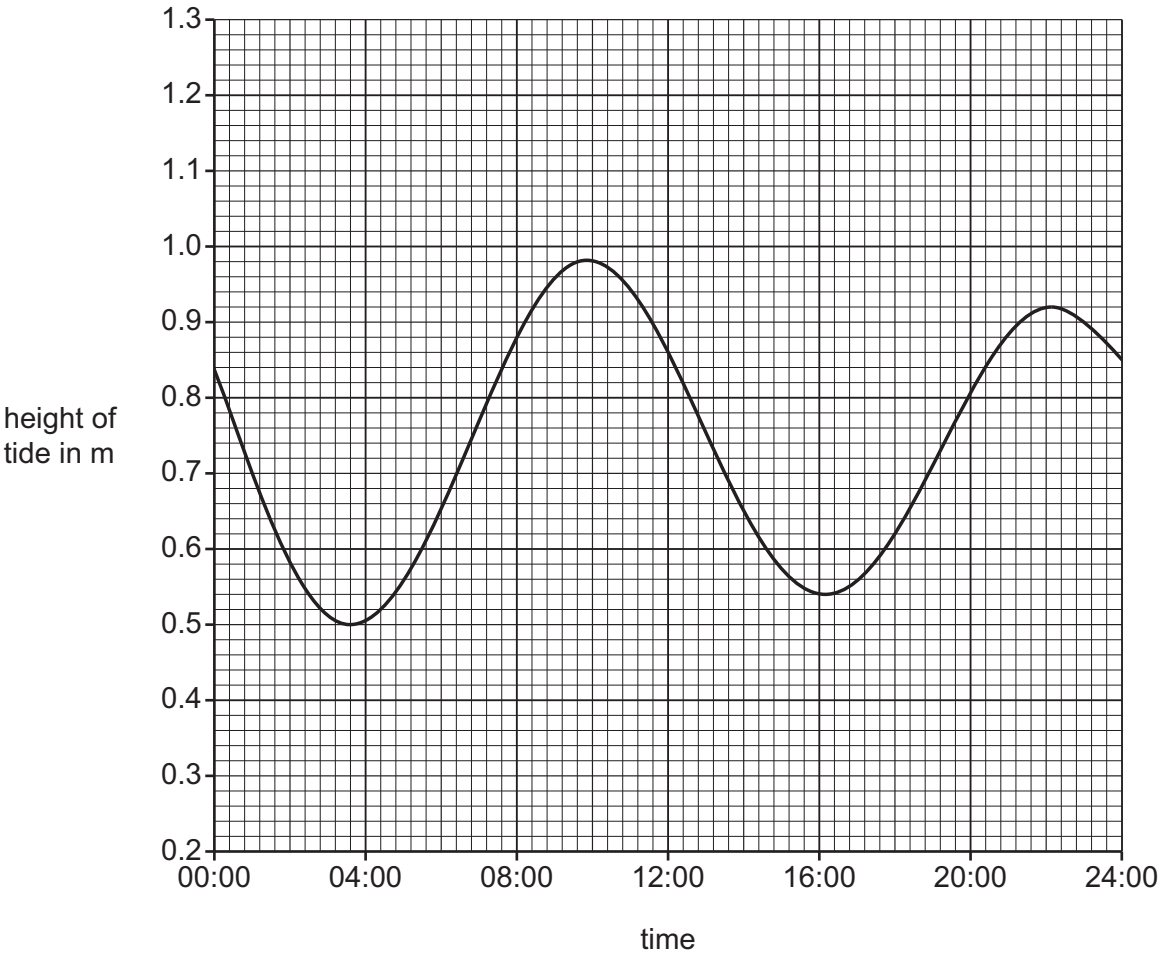

Fig. 1.3

(i) Using Fig. 1.3, calculate the maximum difference between high and low tides on this day.

maximum difference ..... m [1]

(ii) Explain how the position of the Moon in relation to the Earth affects the tidal cycle shown in Fig. 1.3.

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..... [3]

[Total: 9]

2 Fig. 2.1 shows the intertidal zone of a rocky shore.

Fig. 2.1

(a) (i) Rocky shores are a type of coastal ecosystem.

State **two** other types of coastal ecosystem.

1 .....

2 .....

[2]

(ii) State **two** differences between the abiotic factors of the intertidal zone of a rocky shore compared with the supratidal zone of a rocky shore.

1 .....

.....

2 .....

.....

[2]

(b) Fig. 2.2 shows one rocky shore food chain.

macroalgae ⟶ limpets ⟶ starfish

Fig. 2.2

A student investigates the distribution of macroalgae, limpets and starfish along a rocky shore from the subtidal zone to the supratidal zone.

Fig. 2.3 is a graph showing the data obtained by the student.

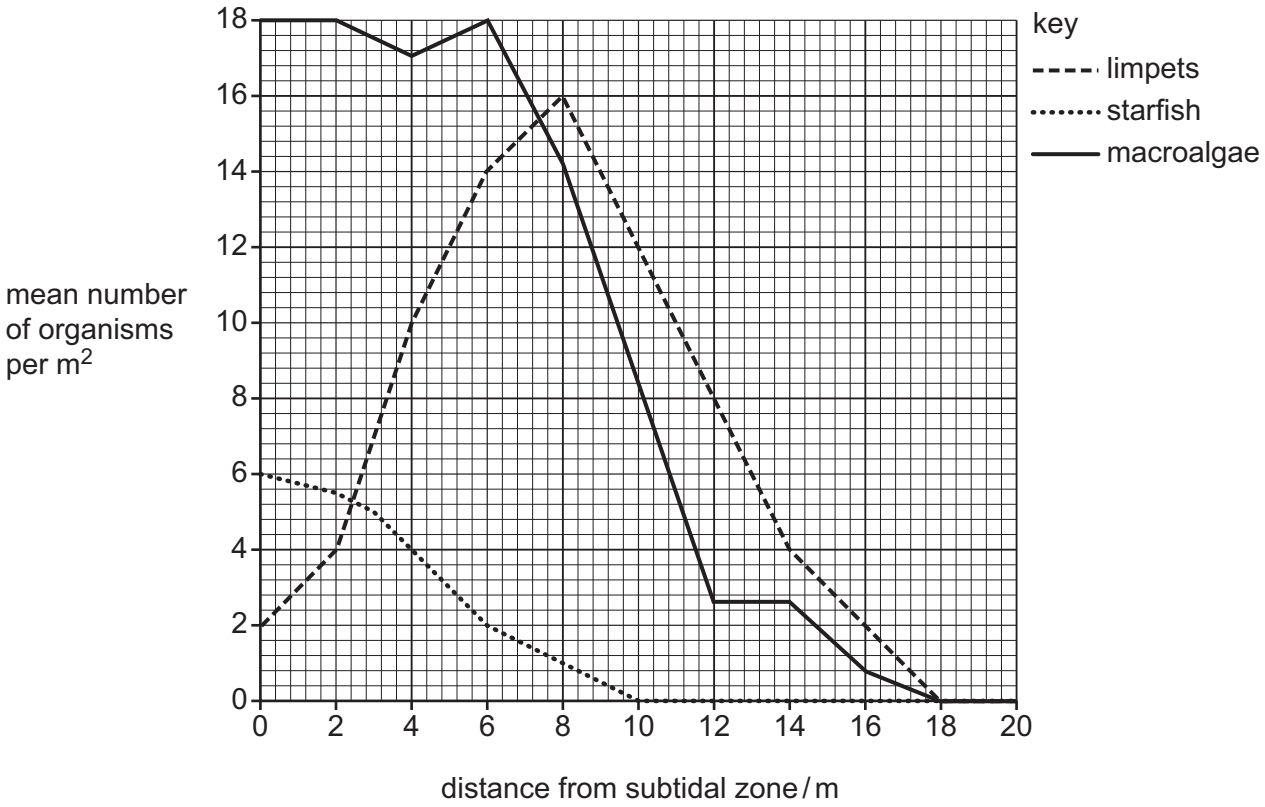

Fig. 2.3

(i) Starfish are predatory echinoderms that eat limpets.

Give **two** characteristic features of echinoderms.

1 .....

2 .....

[2]

(ii) Suggest a method that the student used to collect the data shown in Fig. 2.3.

.....

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..... [4]

(iii) Give **one** safety precaution for working on a rocky shore.

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..... [1]

(iv) Discuss the factors that affect the distribution of organisms shown in Fig. 2.3.

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..... [4]

[Total: 15]

3 Fig. 3.1 shows a magnified photograph of part of the body of a lugworm.

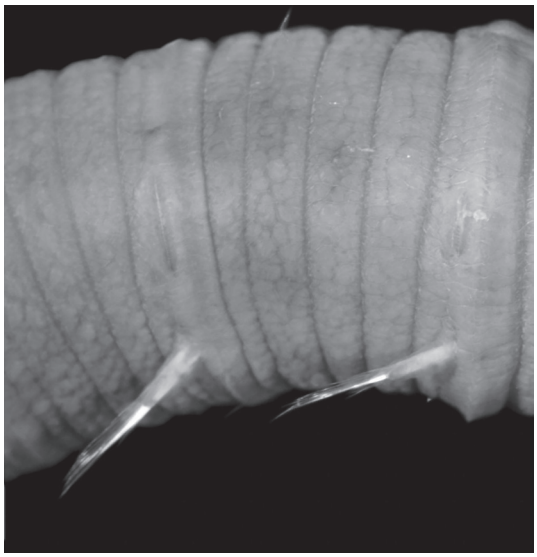

Fig. 3.1

(a) (i) The lugworm in Fig. 3.1 is an animal.

Give **two** structures that are present in plant cells that are **not** present in the cells of the lugworm.

1 .....

2 .....

[2]

(ii) Make a large drawing of the part of the lugworm shown in Fig. 3.1.

Do **not** draw any patterns on the surface of the lugworm.

[4]

(iii) Setae are one characteristic feature of annelids.

Label **one** of the setae on your drawing. Use a label line.

[1]

(iv) State **one** characteristic feature of annelids, other than setae.

..... [1]

(b) Lugworms live in wet, sandy shores.

(i) Outline a method that can be used to measure the percentage moisture content of the substrate in a sandy shore.

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..... [4]

(ii) Lugworms require a source of iron in their diet.

Explain why lugworms **cannot** survive on sandy shores if they do not obtain enough iron.

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..... [3]

[Total: 15]

4 Bermuda is in the North Atlantic Ocean and consists of a group of islands.

Fig. 4.1 shows the change in sea water pH with time near Bermuda between 1983 and 2016. A trend line has been drawn.

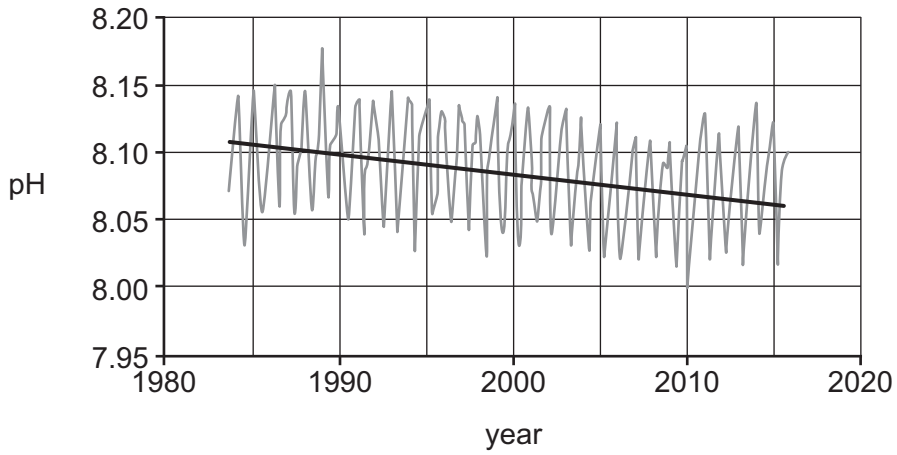

Fig. 4.1

(a) (i) Outline the changes in pH of the sea water between 1983 and 2016 shown in Fig. 4.1.

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..... [2]

(ii) Explain how using fossil fuels may have contributed to the trend in pH of sea water shown in Fig. 4.1.

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..... [3]

(iii) Describe how to compare the pH of samples of water using universal indicator.

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..... [3]

(b) Using fossil fuels may also lead to the melting of sea ice and land ice.

Describe **three** other negative effects on marine ecosystems of using fossil fuels.

1 .....

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2 .....

.....

3 .....

.....

[3]

[Total: 11]

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5 Fig. 5.1 shows the Indian Ocean. Fishing in area **Y** is controlled by the South West Indian Ocean Fisheries Commission (SWIOFC). Fishing in area **X** is not controlled by any country or international agreement. Fishing in area **X** has increased over time.

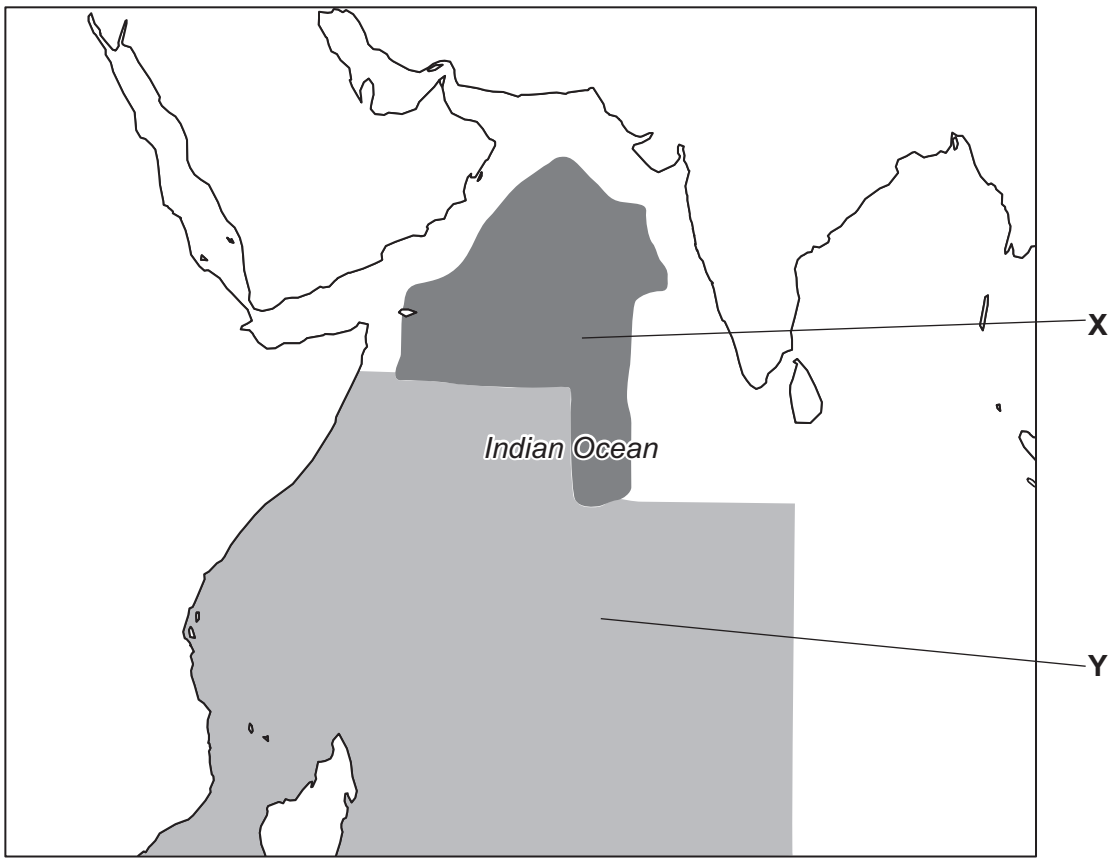

Fig. 5.1

(a) SWIOFC controls fishing methods in area **Y** for countries that have chosen to sign an international agreement.

Discuss the role of SWIOFC in maintaining sustainable fishing in area **Y**.

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..... [3]

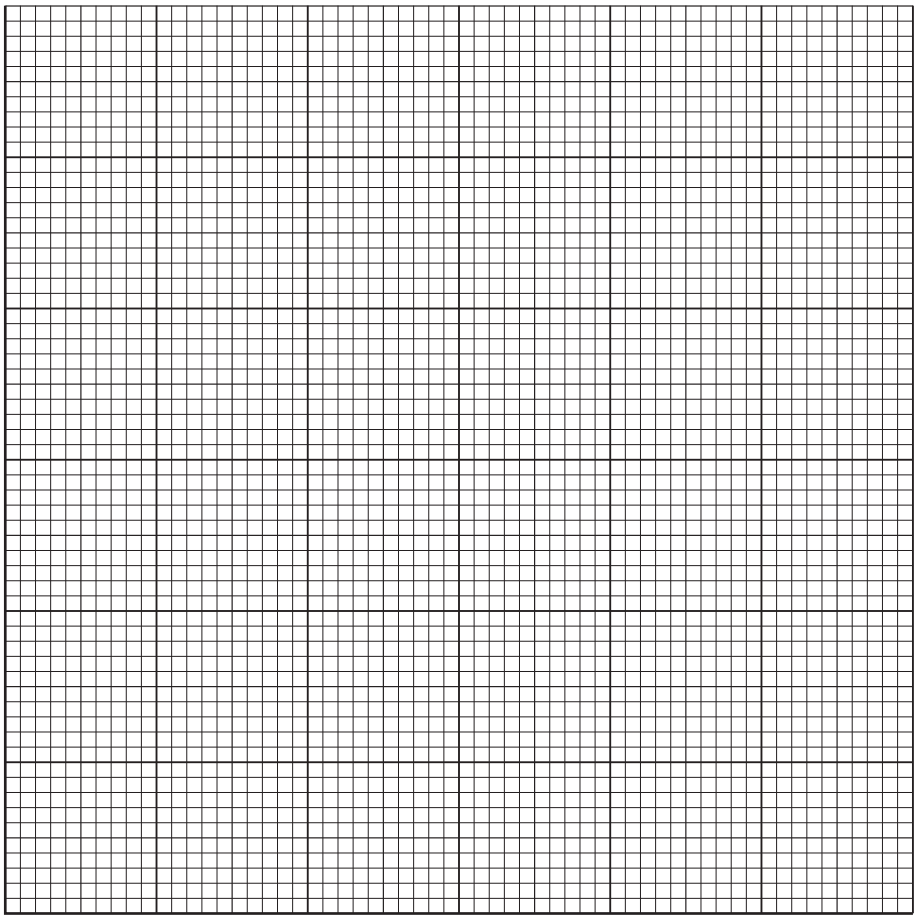
(b) Many fishing vessels carry automatic identification systems (AIS). AIS signals can be detected by authorities to identify when fishing vessels are present in an area.

Table 5.1 shows the total number of fishing hours in area **X** between 2015 and 2019.

Table 5.1

year	total number of fishing hours in area X / hr
2015	2000
2016	4600
2017	15000
2018	24000
2019	44000

(i) Plot a bar chart to show the total number of fishing hours in area **X** between 2015 and 2019.



[4]

(ii) Between 2015 and 2019 the total fishing hours in area **X** increased.

Calculate the percentage increase in total fishing hours in area **X** between 2015 and 2019.

Show your working.

percentage increase ..... % [2]

(iii) Suggest **two** reasons why the total number of fishing hours in area **X** has increased.

1 .....

.....

2 .....

.....

[2]

(iv) The total number of fishing hours in area **X** was calculated by measuring the length of time that AIS signals were detected.

Suggest **two** reasons why the data may **not** be a reliable estimate of the total number of fishing hours.

1 .....

.....

2 .....

.....

[2]

[Total: 13]

6 The salinity of sea water is affected by temperature.

A student investigates the changes in temperature and salinity of a pool of sea water on a rocky shore during one morning.

Fig. 6.1 shows the results.

11:00 am
temperature: 24 °C
salinity: 40 ppt

10:00 am
salinity: 39 ppt
temperature: 21 °C

8:00 am
salinity: 35 ppt
temperature: 18 °C

9:00 am
temperature: 20 °C
salinity: 37 ppt

7:00 am
salinity: 35 ppt
temperature: 18 °C

Fig. 6.1

(a) (i) Draw a results table to display the data shown in Fig. 6.1.

Order the data by increasing time.

[3]

(ii) Explain the student's results shown in Fig. 6.1.

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..... [3]

(b) (i) State why it would be better to take several readings at each time.

.....

..... [1]

(ii) Explain **one** variable that the student needs to keep constant when testing if temperature is the main factor that affects salinity.

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.....

..... [2]

[Total: 9]

7 Sewage released into the sea can affect the pH of the water. Changing the pH of the water can affect the growth of photosynthetic producer organisms.

(a) Complete the word equation for photosynthesis.

..... + ... → ..... + oxygen

[2]

(b) Describe a safe laboratory experiment to investigate the effect of changing pH on the rate of oxygen production by photosynthesis of a producer organism.

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..... [6]

[Total: 8]

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