Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2023–2024

Single Award Science: Biology

Unit 1

Foundation Tier

[GSA11]

GSA11

FRIDAY 17 MAY 2024, MORNING

TIME

1 hour.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
You must answer the questions in the spaces provided.
Do not write outside the boxed area on each page or on blank pages.
Complete in black ink only. **Do not write with a gel pen.**
Answer **all eight** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 60.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.
Quality of written communication will be assessed in Question **8(a)**.

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20GSA1101

1 Tobacco and alcohol use can affect health.

(a) In the table below place a tick (✓) beside **two** harmful substances found in cigarette smoke.

Substance	Found in cigarette smoke
oxygen	
nicotine	
carbon monoxide	
carbon dioxide	

[2]

(b) **(i)** Name the organ in the body most affected by drinking alcohol.

Circle your answer.

lungs **liver** **heart**

[1]

(ii) Complete the sentence below to explain what is meant by the term binge drinking.

Choose from:

strong **long** **large** **short**

Binge drinking occurs when a _____ amount of alcohol is taken into our bodies over a _____ period of time. [2]

2 **(a)** To keep us healthy we need to eat a variety of foods containing different biological molecules.

The photographs below show three different foods **A**, **B** and **C**.

A

potatoes

B

oranges

C

fish

(i) Use the letters **A**, **B** or **C** to choose which food is the best source of each biological molecule.

Each letter should only be used **once**.

Biological molecule	Food
carbohydrate	
protein	
vitamin C	

[2]

Fibre is another important biological molecule that we need to keep us healthy.

(ii) Give **one** function of fibre in the body.

Circle your answer.

to make red blood cells

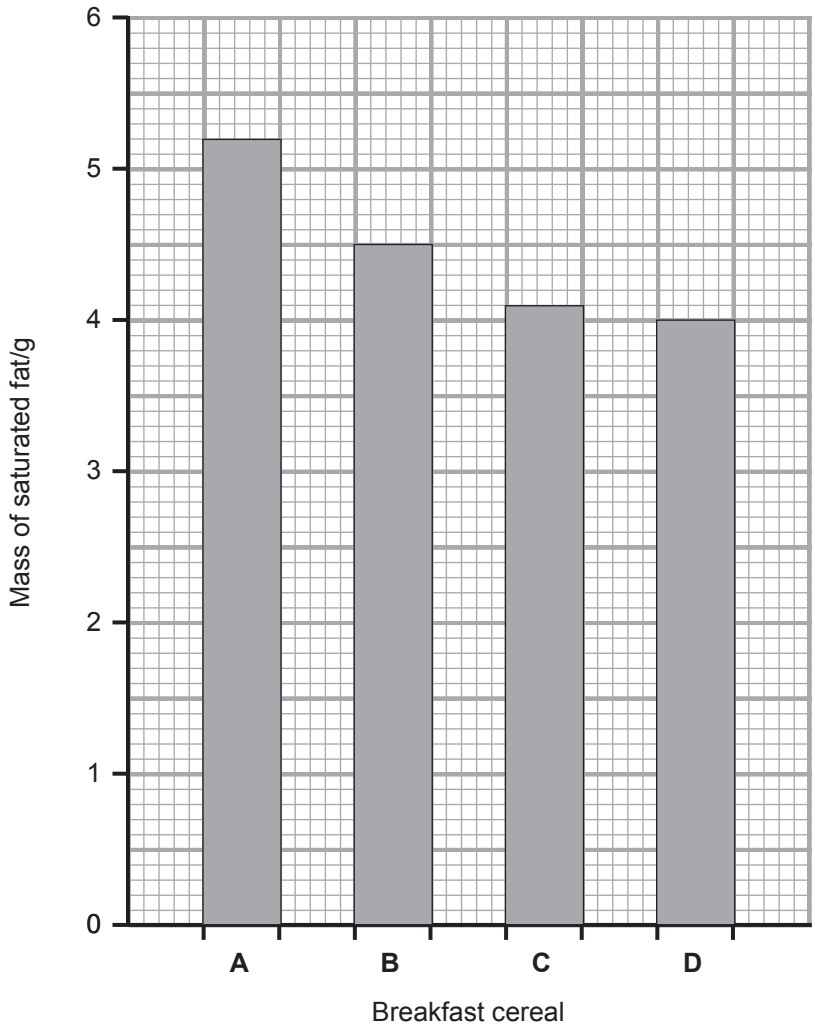
to prevent constipation

for growth and repair

[1]

[Turn over

The graph below shows the mass of saturated fat present in **100 g** of four different breakfast cereals **A**, **B**, **C** and **D**.



(b) Use the graph to calculate the difference in the mass of saturated fat between cereals **A** and **B**.

(Show your working out.)

_____ g [2]

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The statements below describe how a food is tested to find out if it contains fat.

They are **not** in the correct order.

A add 2 cm^3 of water to see the final colour

B crush up the food

C add 2 cm^3 of ethanol and shake the boiling tube

D place the crushed food in a boiling tube

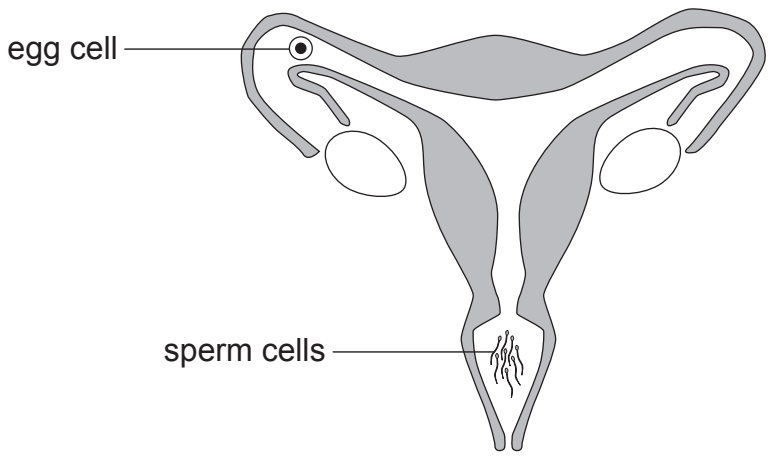
(c) Use the letters **A**, **B**, **C** and **D** to place these statements in the correct order.

_____ _____ _____ _____ [2]

(d) Name the reagent used to test for **protein** in food.

_____ [1]

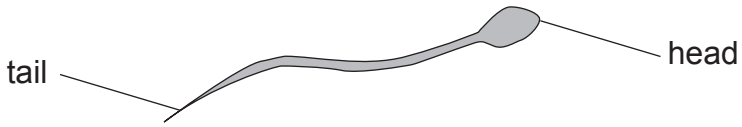
3 **(a)** The diagram below shows the female reproductive system. It also shows where sperm cells are placed during sexual intercourse.



(i) Name the part of the female reproductive system where the sperm cells are placed during sexual intercourse.

_____ [1]

The diagram below shows one sperm cell.

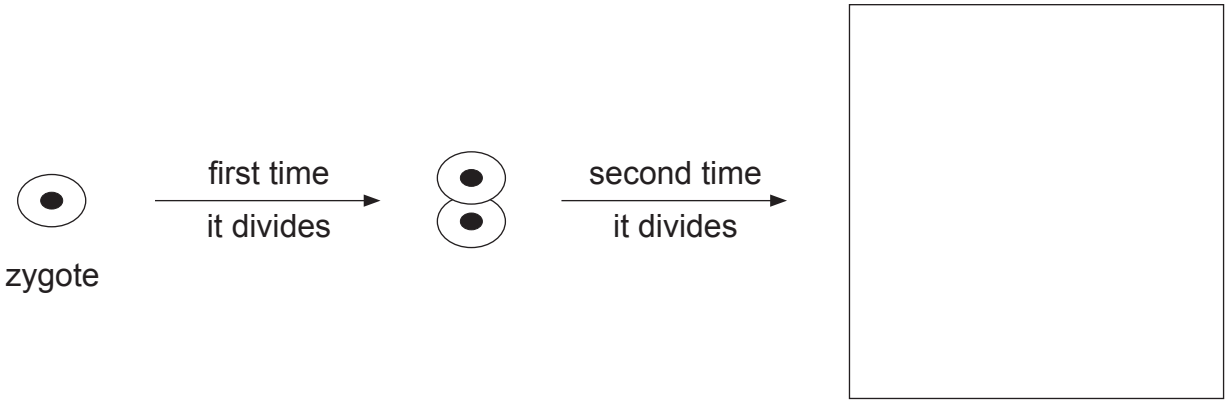


(ii) The sperm cell has a head and a tail.
Suggest how the tail allows the sperm cell to meet the egg cell.

_____ [1]

When a sperm cell and an egg cell meet, fertilisation takes place and a zygote is formed.

(b) Complete the diagram below to show what happens to this zygote after it divides for a second time.



[2]

After the zygote has divided many times it implants into the uterus lining and the placenta develops.

(c) Complete the sentences below to describe the role of the placenta.

Choose from:

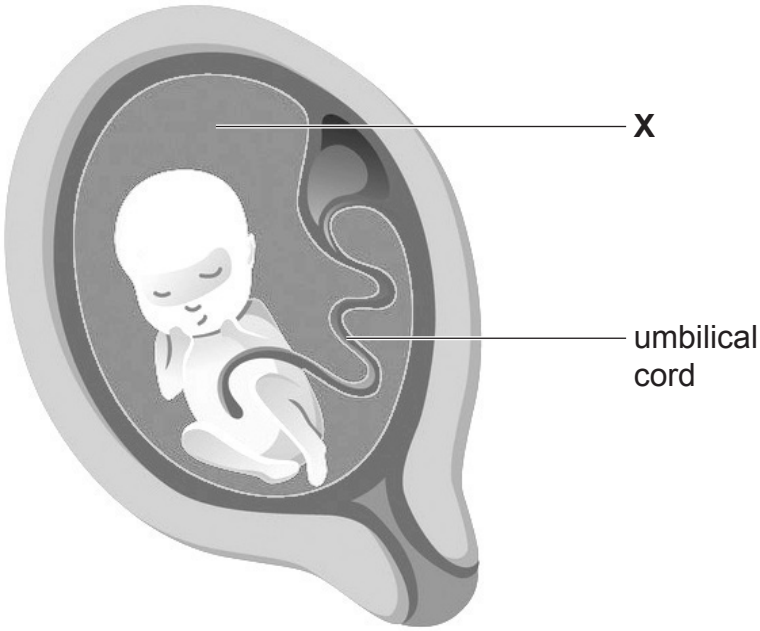
food **nutrients** **urine** **urea**

Oxygen and dissolved _____ pass across the placenta from the mother to the developing baby.

Carbon dioxide and _____ pass across the placenta from the developing baby to the mother. [2]

[Turn over

The diagram below shows the developing baby in the uterus.



(d) Name and give the function of the part labelled **X**.

Name _____

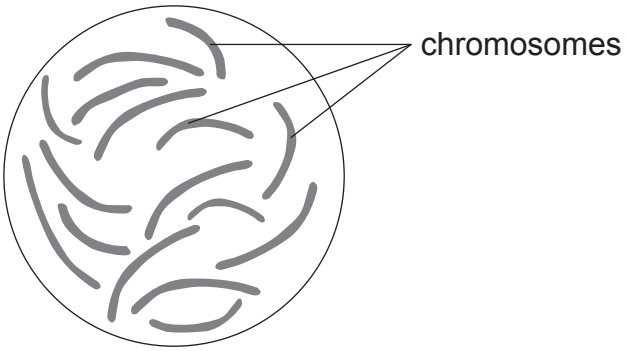
Function _____

_____ [2]

4 **(a)** The table below shows the number of chromosomes in the cell nuclei of four different organisms.

Organism	Number of chromosomes	Mass of organism/kg
kangaroo	16	50
chicken	78	3
human	46	70
crab	254	4

The diagram below shows the number of chromosomes in the nucleus of a cell from one of these organisms.



(i) Which organism, named in the table, does this cell nucleus come from?

_____ [1]

(ii) A student thought that the greater the mass of an organism the more chromosomes it will have. What evidence in the table shows that this is **not** correct?

_____

_____

_____ [1]

(b) Name the chemical which makes up genes and chromosomes.

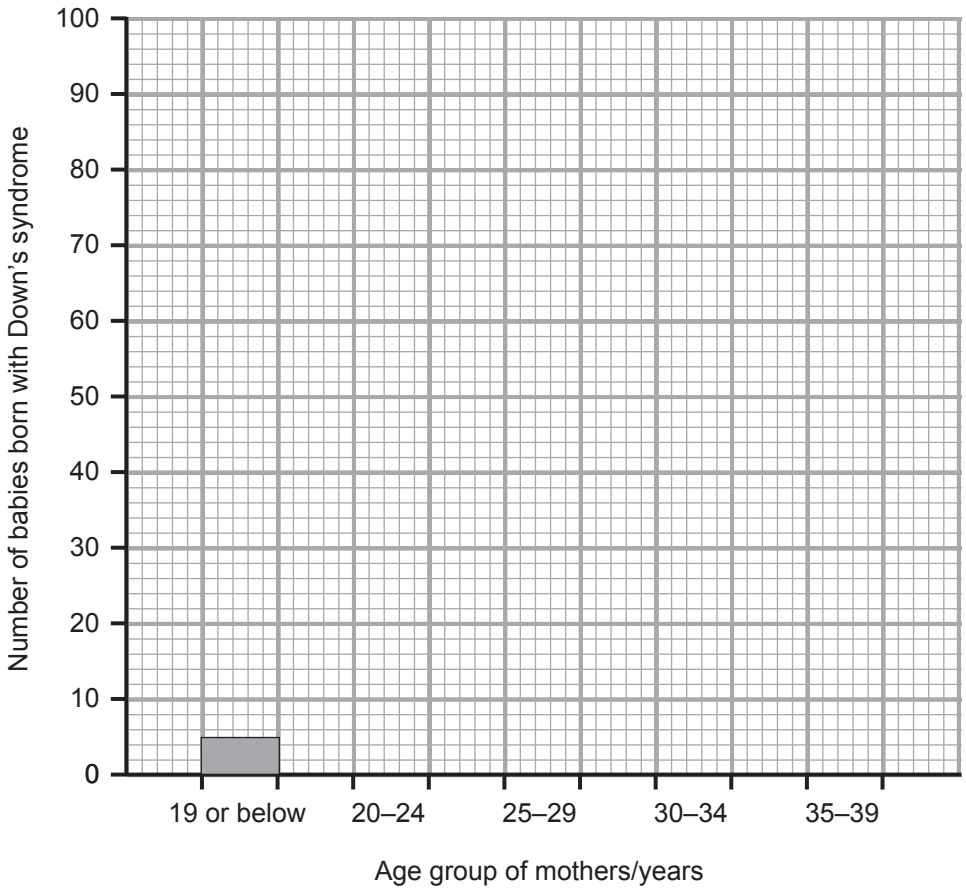
_____ [1]

[Turn over

(c) The table below shows the number of babies born with Down's syndrome to mothers in different age groups in Northern Ireland over a four-year period.

Age group of mothers/ years	Number of babies born with Down's syndrome
19 or below	5
20–24	15
25–29	26
30–34	52
35–39	96

(i) On the grid below, complete the bar chart to show this information. The first bar has been plotted for you.



[2]

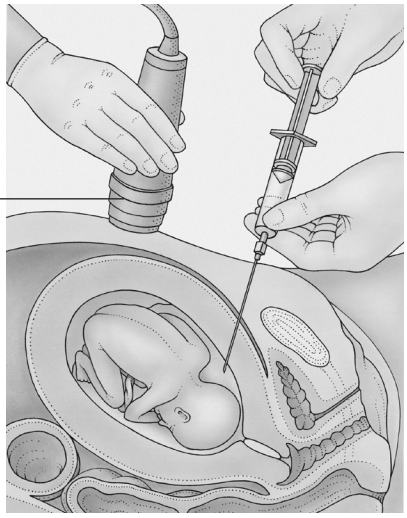
(ii) Complete the sentence below to describe the trend shown by this information.

As the age group of mothers increases the _____

_____ [1]

Amniocentesis is a test to check if a developing baby has a genetic condition such as Down's syndrome.

The diagram below shows an amniocentesis test.



(iii) Suggest why the doctor will carry out an ultrasound scan to see the position of the baby while the amniocentesis test is taking place.

_____

_____ [1]

(iv) In which age group would a mother be most likely to be offered this test?

Circle your answer.

20–24 years : **25–29 years** : **35–39 years**

[1]

[Turn over

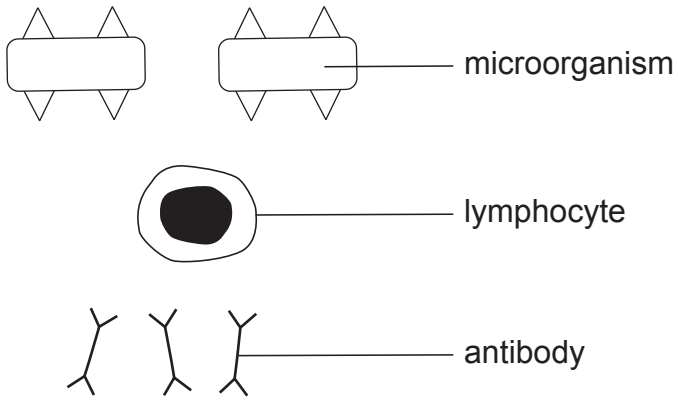
5 The body has defence mechanisms against disease.

(a) Name **two** defence mechanisms which prevent the entry of microorganisms into the body.

1. _____

2. _____ [2]

The diagram below shows the antibodies produced by a lymphocyte in a person infected by a microorganism.



(b) Describe how these antibodies prevent this microorganism from spreading.

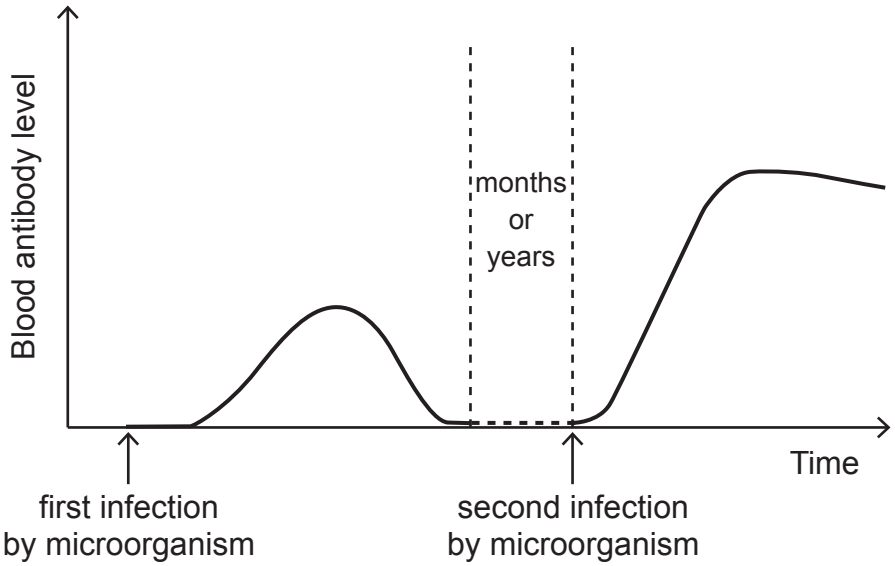
_____

_____

_____

_____ [3]

(c) The graph below shows how antibody levels in the blood change when a person is infected by this microorganism at two different times.



(i) Explain why the body's response to the second infection is faster than its response to the first infection.

_____

_____ [1]

(ii) Use the graph to give two **other** ways the body's response to the second infection is different from its response to the first infection.

1. _____

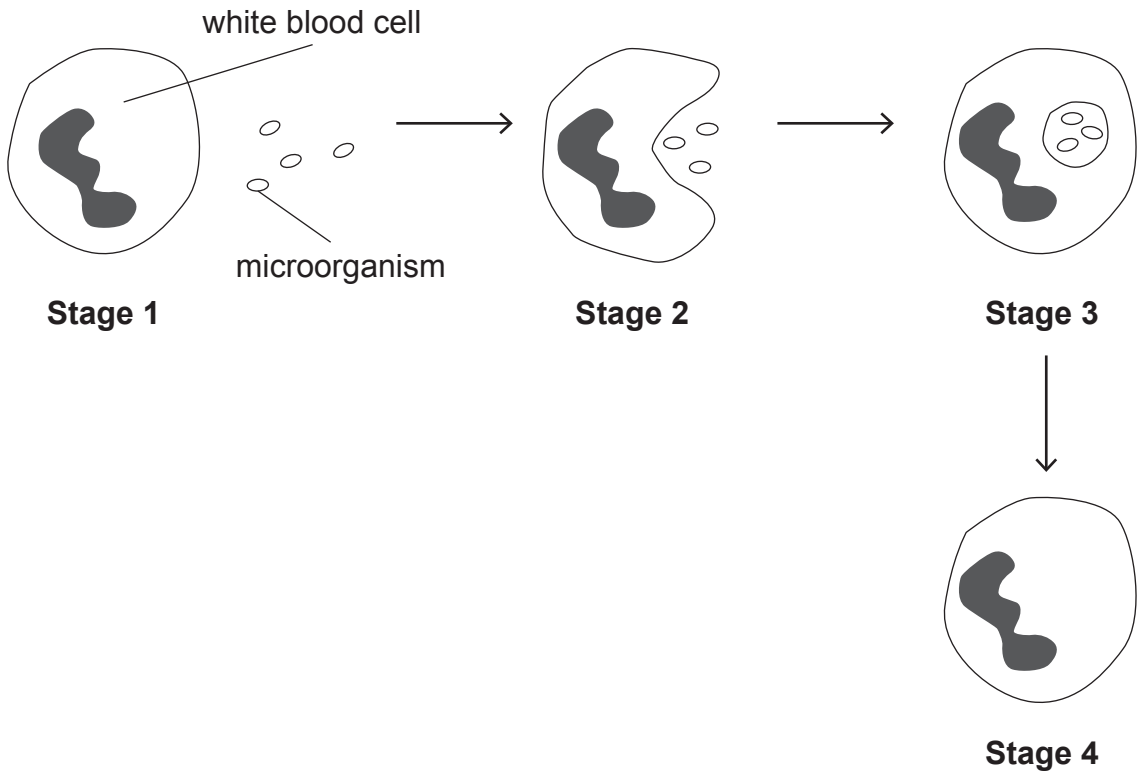
_____

2. _____

_____ [2]

[Turn over

(d) The diagram below shows how another type of white blood cell helps the body to fight infection.



(i) Name the type of white blood cell shown in the diagram above.

_____ [1]

(ii) Use the diagram and your knowledge to describe what is happening from **stages 2** to **4** in this process to help the body fight infection.

_____

_____

_____ [2]

6 **(a)** The photograph below shows an insulin pump being used by a person with diabetes. An insulin pump is a small electronic device that continually releases small doses of insulin into the body.

(i) What is the function of insulin in the body?

_____

_____ [1]

(ii) Suggest **one** advantage of using the insulin pump instead of injections to supply insulin to a person with diabetes.

_____

_____ [1]

[Turn over

In Northern Ireland approximately **8000** people have Type 1 diabetes and **1500** of these people use insulin pumps.

(iii) Calculate the percentage of people living with Type 1 diabetes in Northern Ireland who use insulin pumps.

(Show your working out.)

_____ % [2]

(b) Insulin is a hormone. Give **two** features of a hormone.

1. _____

2. _____ [2]

7 Protecting fish stocks is one way humans can have a positive effect on biodiversity.

(a) What is meant by the term **biodiversity**?

_____

_____ [1]

(b) Overfishing results in so many fish being removed from an area that some species of fish are at risk of dying out.

(i) Suggest **one** reason why modern fishing methods have led to overfishing.

_____

_____ [1]

(ii) Give **two** measures that can be taken to prevent overfishing and protect fish stocks.

1. _____

2. _____ [2]

8 The photographs below show some of the equipment required to investigate planting density.

plant pots

seeds

watering can

compost

(a) Describe how you would investigate the effect of changing the number of seeds in a pot on plant growth.

Your answer should include:
- two things that make the investigation a fair test (valid);
- the measurements you need to take; and
- a description and explanation of the results you would expect.

In this question you will be assessed on your written communication skills including the use of specialist scientific terms.

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_____

_____

_____

_____

_____

_____

_____ [6]

(b) Photosynthesis takes place in plants.

(i) Complete the word equation below for photosynthesis.

carbon dioxide	+		→		+	oxygen

[2]

(ii) Name the structure in plant cells where photosynthesis takes place.

_____ [1]

(iii) Complete the sentence below about photosynthesis.

Photosynthesis takes in and uses energy, this means it can be described as an _____ reaction. [1]

THIS IS THE END OF THE QUESTION PAPER

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Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
Total Marks	

Examiner Number

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