New Specification

Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2018–2019

Double Award Science
Biology

Unit B1
Higher Tier

ML

[GDW12]

WEDNESDAY 7 NOVEMBER 2018, MORNING

TIME

1 hour, plus your additional time allowance.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
Write your answers in the spaces provided in this question paper.
Answer **all nine** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 70.
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 **4**.

For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	
Total Marks	

Examiner Only	
Marks	Remark

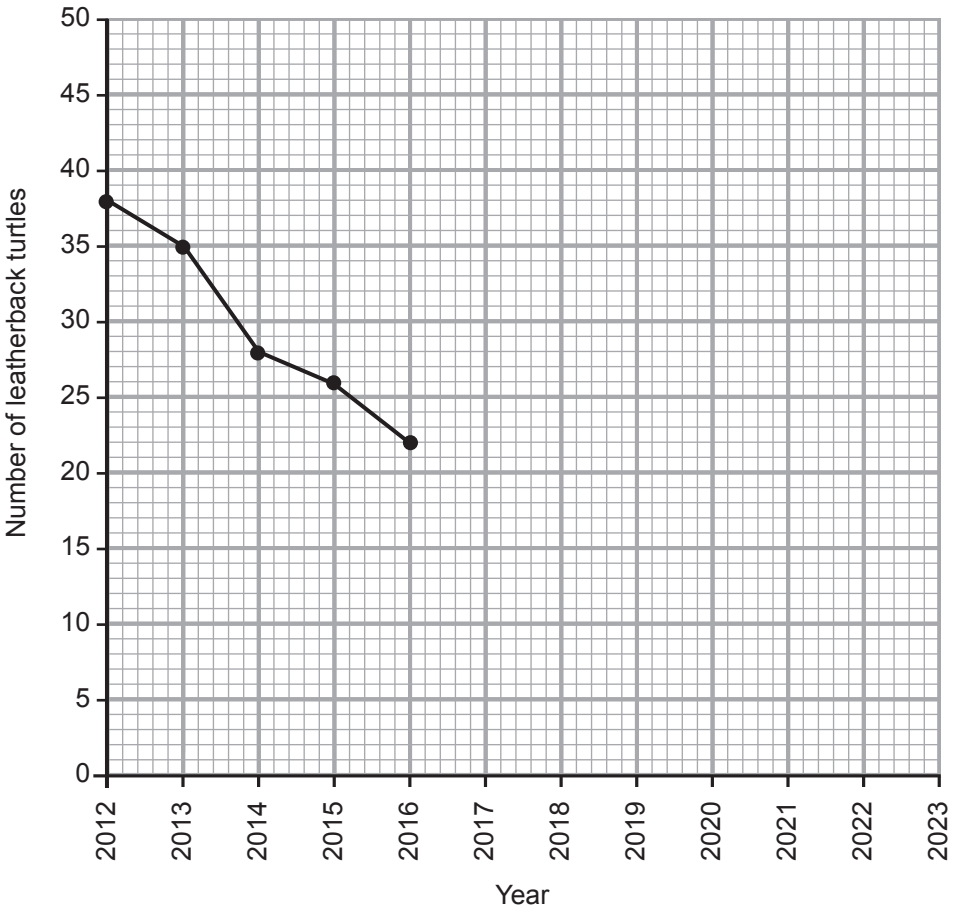
1 Leatherback turtles live in the sea. Female leatherback turtles make short trips onto beaches at night time to lay eggs.

The photograph below shows a leatherback turtle.

© irin717 / iStock / Thinkstock

Scientists recorded the number of leatherback turtles they saw on a beach in Costa Rica during the breeding season each year from 2012 to 2016.

The graph below shows the scientists' results.



Source: leatherback.org

Using the information from the graph opposite, answer the following questions.

Examiner Only	
Marks	Remark

(a) Describe the overall trend for the number of leatherback turtles from 2012 to 2016.

_____

_____ [1]

(b) Assume that the trend in the number of leatherback turtles continues at the same rate as **2015 to 2016**.

(i) Draw a line on the graph to predict the first year when **no** leatherback turtles will visit this beach. [1]

(ii) Write down this year.

Year _____ [1]

(c) Suggest **one** human activity that could affect the number of leatherback turtles.

_____

_____ [1]

(d) Give **one abiotic** factor that could affect the number of leatherback turtles.

_____

_____ [1]

(e) Give **two** resources the leatherback turtles compete for.

1 _____

2 _____ [2]

Examiner Only	
Marks	Remark

2 **(a)** A scientist investigated the effect of ripening on the starch and glucose content of bananas.

Look at the photographs below.
They show bananas at four stages of ripeness.

Stage 1
Green, unripe and hard.

Stage 2
Yellow

Stage 3
Brown spots

Stage 4
Brown, overripe and soft

© Ted Kinsman / Science Photo Library

The scientist cut two 1cm thick slices from a banana at each stage of ripeness.

She tested one slice for starch and one slice for glucose.

(i) Name the food test reagent the scientist used to test for **starch**.

Reagent _____

Write down the colour change expected for a positive result.

Colour change: yellow-brown to _____ [2]

(ii) Name the food test reagent the scientist used to test for **glucose**.

Reagent _____

Write down the colour change expected for a positive result.

Colour change: blue to _____ [2]

Examiner Only

Marks	Remark

(b) Look at the table below.
It shows the starch and glucose content in the bananas at each stage of ripeness.

Stage of ripeness	Starch content	Glucose content
1	high	none
2	medium	low
3	low	medium
4	none	high

Source: Principal Examiner

(i) Using the results in the table above, describe the change in the glucose content from stage 1 to stage 4.

_____

_____ [1]

(ii) Suggest a reason for this change.

_____

_____

_____

_____ [2]

Bananas contain an enzyme that causes them to ripen.

(c) Use your knowledge of enzymes to explain why bananas kept in a fridge at 4 °C will take longer to ripen than bananas kept at room temperature.

_____

_____

_____

_____

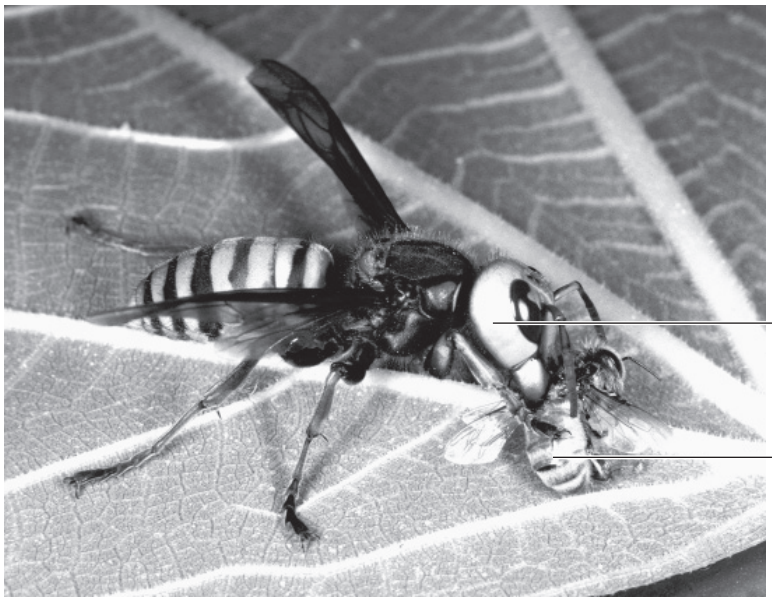
_____

_____

_____

_____ [3]

3 Look at the photograph below. It shows an Asian hornet and a honeybee.



© Scott Camazine / Science Photo Library

Read the passage below and answer the questions that follow.

Honeybees feed on nectar from plants.
Beekeepers, gardeners and the public in Northern Ireland are being asked to be on the lookout for invading Asian hornets that feed on honeybees.
Asian hornets have been seen in England but not yet in Northern Ireland.
In England, their nests have been destroyed by experts as soon as they are found.

One Asian hornet nest contains 6000 hornets.
One Asian hornet kills 50 honeybees in one day.

(a) In the space below draw a food chain containing **three** organisms from the passage.

[2]

Examiner Only	
Marks	Remark

(b) (i) Calculate how many honeybees can be killed by 6000 hornets in one day.

Examiner Only

Marks	Remark

_____ honeybees [1]

(ii) A beekeeper has 10 beehives each containing 60 000 honeybees.

Using your answer from part **(b)(i)**, calculate how long it could take for 6000 hornets to kill all the honeybees owned by this beekeeper.

Show your working out.

_____ days [2]

(c) Why are Asian hornets' nests destroyed as soon as they are found?

_____

_____ [1]

4 Diabetes affects a large number of people worldwide.
There are two types of diabetes.

Describe the **two** types of diabetes.

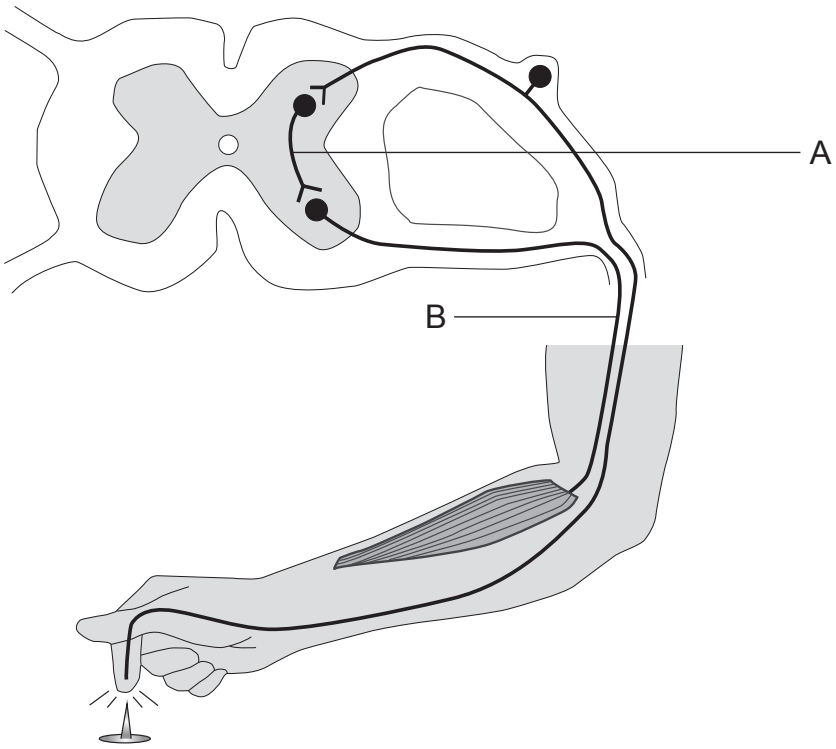
Include in your answer:
- the name of each type of diabetes
- the difference in insulin production in each type of diabetes
- how each type of diabetes can be controlled.

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

[6]

Examiner Only	
Marks	Remark

5 The diagram below shows a spinal reflex arc.



Source: CCEA

(a) What is the stimulus shown in the diagram?

_____ [1]

(b) Name neurones A and B.

A _____

B _____ [2]

(c) Draw an arrow on neurone A to show the direction of the nerve impulse. [1]

(d) Name the effector in this spinal reflex arc.

_____ [1]

(e) One part of the central nervous system is **not** involved in a reflex arc. Name this part.

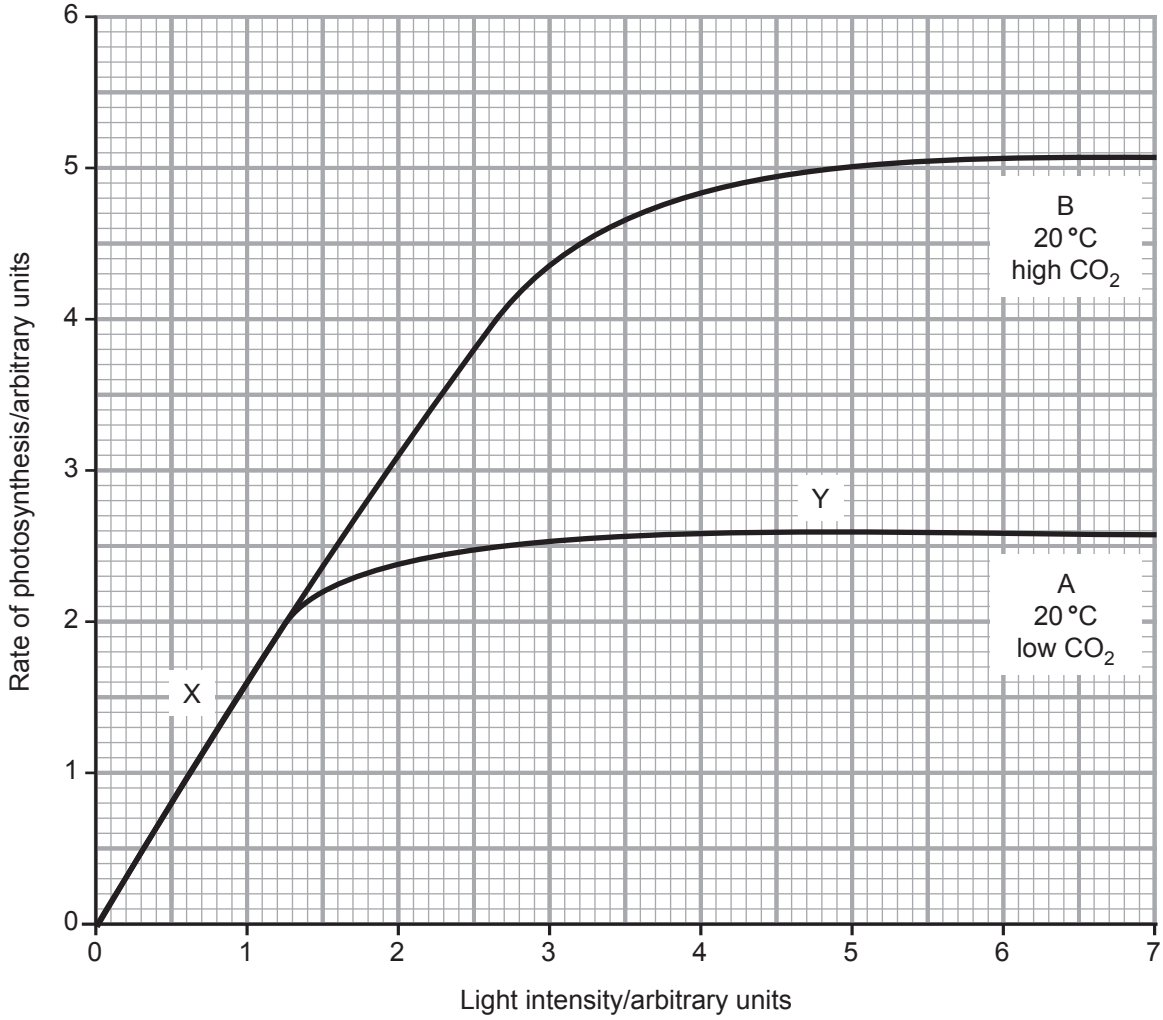
_____ [1]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

6 The graph shows the effect of different light intensities on the rate of photosynthesis at:

A: 20 °C with low carbon dioxide (CO_2) levels
B: 20 °C with high carbon dioxide (CO_2) levels



(a) Give **one** factor that limits the rate of photosynthesis at point X.

_____ [1]

(b) Give **one** factor that limits the rate of photosynthesis at point Y.

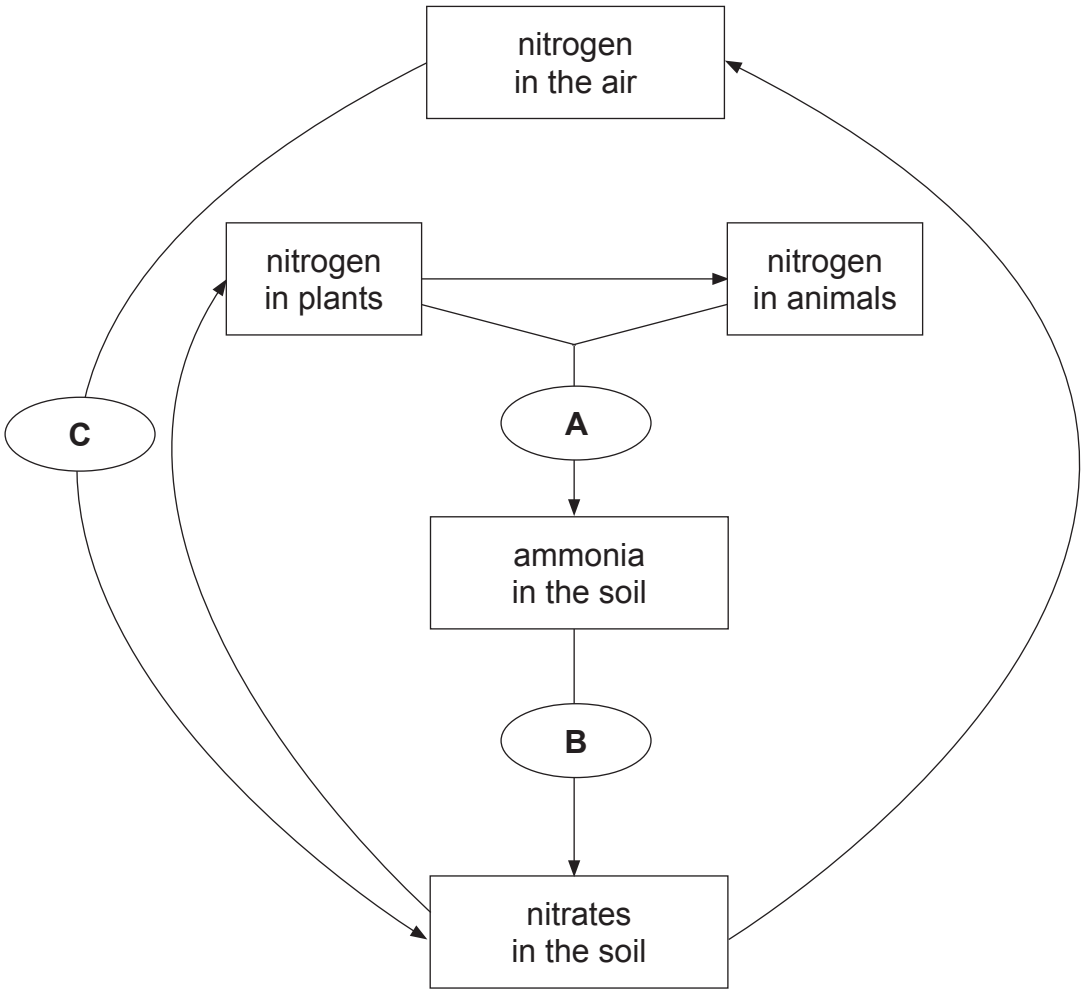
_____ [1]

(c) Draw a **line** on the graph to show the effect of increasing light intensity on the rate of photosynthesis when the temperature is **10 °C** and the carbon dioxide level is **low**. [2]

BLANK PAGE

(Questions continue overleaf)

7 The diagram shows part of the nitrogen cycle.



(a) Name processes **A**, **B** and **C**.

A _____

B _____

C _____ [3]

Examiner Only

Marks	Remark

The photograph shows a waterlogged field.
Waterlogged fields contain less oxygen than normal.

© simazoran / iStock / Thinkstock

Use the diagram of the **nitrogen cycle opposite** to help answer the following questions.

(b) Explain how waterlogging reduces the amount of nitrates present **in the soil** of this field.

[3]

Examiner Only

Marks	Remark

Examiner Only	
Marks	Remark

(c) Describe and explain how waterlogging affects the amount of nitrates **absorbed by the roots** of plants growing in this field.

Description _____ [1]

Explanation _____

_____

_____

_____

_____

_____ [2]

(d) Excess nitrates entering a river cause eutrophication.
This results in initial algal growth followed by algae dying.

(i) Name **one** type of organism that decomposes the dead algae.

_____ [1]

(ii) Describe and explain how biodiversity in the river is affected by eutrophication.

Description _____ [1]

Explanation _____

_____

_____

_____ [2]

BLANK PAGE

(Questions continue overleaf)

Examiner Only	
Marks	Remark

8 **(a)** Give the term used to describe the maintenance of water balance in the body.

_____ [1]

(b) The kidneys filter the blood and produce 180 litres of liquid each day. Only 1.35 litres of this liquid becomes urine each day.

(i) Calculate the percentage of this liquid that becomes urine each day.

Give your answer to 2 decimal places.
Show your working out.

_____ % [2]

(ii) Most of the 180 litres of liquid does not become urine.
What happens to this liquid that does not become urine?

_____

_____

_____

_____ [2]

(c) The body produces a hormone that reduces the volume of urine produced by the kidneys.

(i) Name this hormone.

_____ [1]

(ii) Explain how this hormone reduces the volume of urine produced by the kidneys.

_____

_____ [1]

(d) Light from one side causes plant shoots to bend towards the light. This happens as a result of the uneven distribution of a hormone produced by the plant shoot.

Examiner Only	
Marks	Remark

(i) Name this hormone.

_____ [1]

(ii) Where in the plant shoot is this hormone produced?

_____ [1]

(iii) Explain how the uneven distribution of this hormone causes the plant shoot to bend towards the light.

_____

_____

_____

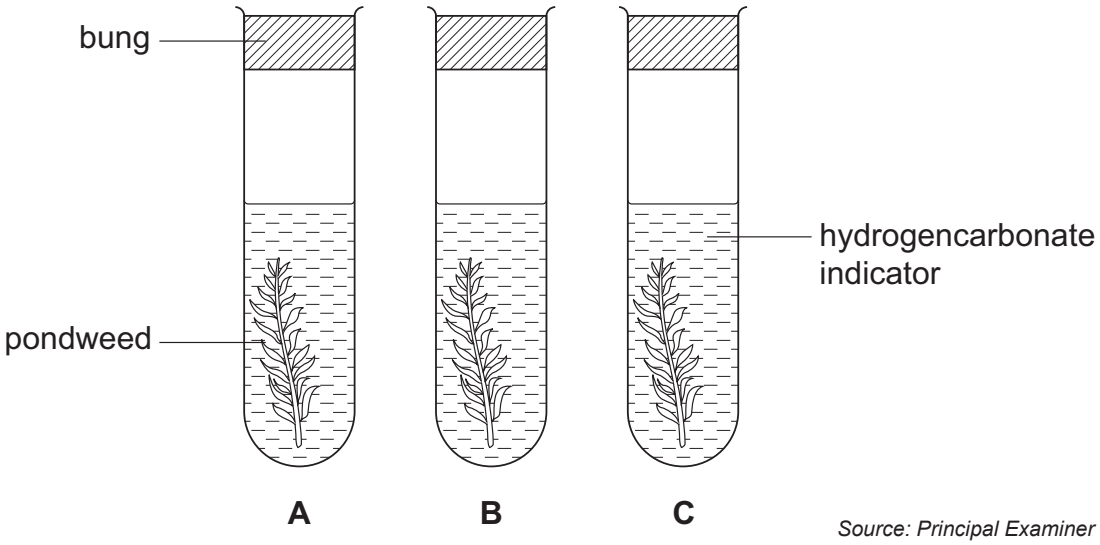
_____

_____ [2]

Examiner Only	
Marks	Remark

9 Students investigated the effect of light intensity on respiration and photosynthesis in pondweed.

They placed three boiling tubes containing pondweed and red hydrogencarbonate indicator in different light conditions for three hours. The diagram below shows their experimental set-up.



Source: Principal Examiner

The table below shows their results.

(a) Complete the table to give the light conditions for boiling tubes A and C.

Boiling tube	Light conditions	Colour of the hydrogencarbonate indicator after three hours
A		Yellow
B	Dim light	Red
C		Purple

[2]

(b) Explain the result for the hydrogencarbonate indicator in boiling tube C.

_____

_____

_____

_____ [2]

(c) **(i)** Which boiling tube, A, B or C, is at compensation point?

Boiling tube _____ [1]

(ii) Explain why this boiling tube is at compensation point.

_____

_____

_____

_____ [2]

Examiner Only	
Marks	Remark

THIS IS THE END OF THE QUESTION PAPER

12020.04 **ML**