New Specification

Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2018

Single Award Science: Biology

Unit 1
Higher Tier

GSA12

[GSA12]

WEDNESDAY 21 FEBRUARY 2018, MORNING

TIME

1 hour.

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.

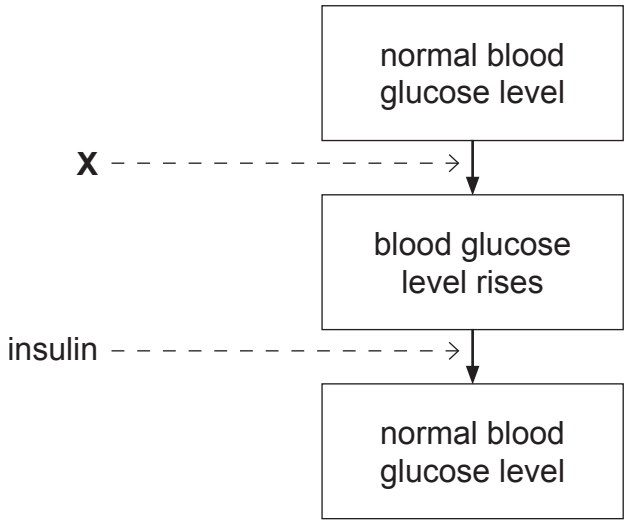
INFORMATION FOR CANDIDATES

The total mark for this paper is 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 **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 **(a)** The flow diagram below summarises the action of insulin in a person.



(i) Explain fully what this person must have done at **X**.

_____

_____

_____ [2]

(ii) Complete the following sentences about insulin.

Insulin changes glucose into _____.

This is then stored by the body in the _____. [2]

(b) People with Type 1 diabetes have to inject themselves with insulin every day for life. They are advised to take regular exercise and eat a balanced diet.

They have to monitor their blood glucose regularly using special instruments so they know how much insulin to inject.

People who have had diabetes for many years or those who have not controlled their blood glucose well are at risk of complications.

Around 10% of the NHS budget is spent on diabetes.

(i) Using the information provided and your knowledge, suggest **two** reasons why the treatment of diabetes is so expensive.

1. _____

2. _____ [2]

(ii) State **one** long-term effect (complication) of diabetes.

_____ [1]

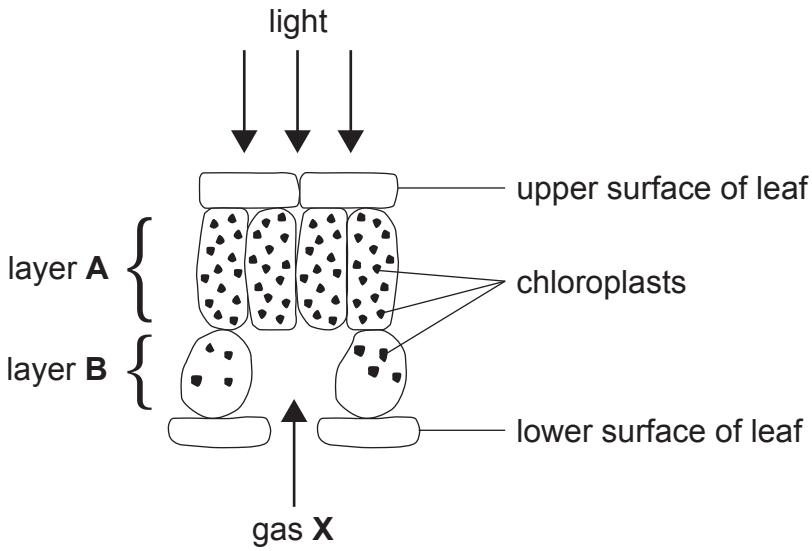
(iii) Give **one** difference between Type 1 and Type 2 diabetes.

_____ [1]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

2 **(a)** The diagram below represents a section through a plant leaf during the day. Photosynthesis takes place in chloroplasts.



(i) Using the information given, suggest **two** reasons why more photosynthesis takes place in layer **A** than layer **B**.

1. _____

2. _____ [2]

(ii) Name the gas labelled **X** that is used in photosynthesis.

_____ [1]

(b) Name the **two** products of photosynthesis.

1. _____

2. _____ [2]

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(Questions continue overleaf)

Examiner Only	
Marks	Remark

3 **(a)** Colds and flu are caused by viruses.
Describe how colds and flu can be spread from person to person.

_____ [1]

(b) There are many different strains of flu and cold viruses. Catching the flu can make people feel very unwell, whereas a cold usually has much less of an effect. Elderly people and people with conditions such as diabetes are offered a flu vaccination each year to boost their immunity.

(i) Suggest why it is important that elderly people are offered a flu vaccination each year.

_____

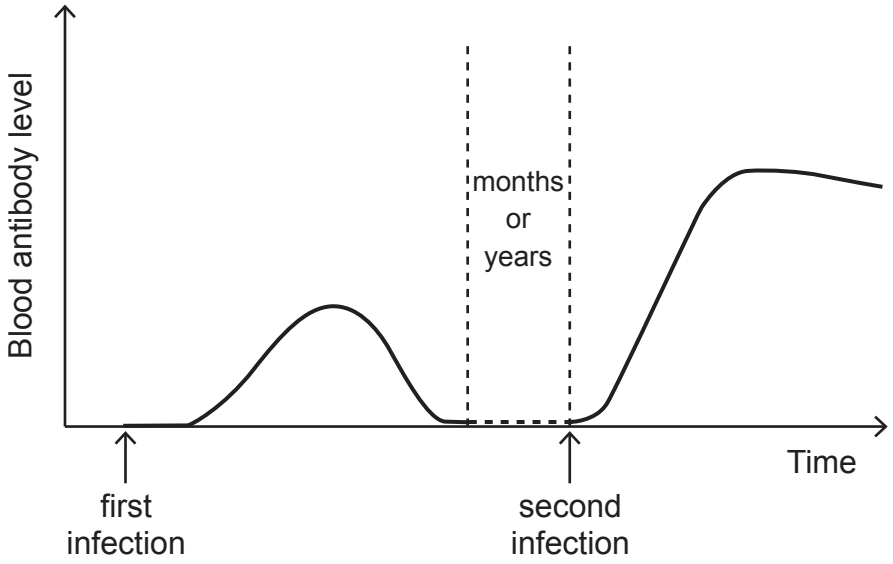
_____ [1]

(ii) Use the information provided to suggest one reason why a vaccination to protect against colds has **not** been developed.

_____

_____ [1]

(c) The graph below shows how antibody levels change when someone is infected by the same disease-causing microorganism for the first time and then again sometime later.



(i) Using the graph, state **two** ways in which the body's response is different when infected a second time with the same type of microorganism.

1. _____

_____

2. _____

_____ [2]

(ii) Name the type of cells which are responsible for producing the body's response to the second infection.

_____ [1]

Examiner Only

Marks	Remark

4 Describe the structure and function of chromosomes.

Your answer should include:

- where chromosomes are found in the cell
- one genetic condition caused by having an incorrect chromosome number

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

[6]

Examiner Only	
Marks	Remark

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(Questions continue overleaf)

Examiner Only	
Marks	Remark

5 In order to promote biodiversity in the surrounding area, brown-field sites are being increasingly used for the building of new houses.

(a) Describe what is meant by the term 'brown-field building site'.

_____

_____ [1]

(b) The table below shows the number of new houses built on brown-field building sites in one council area over a 20-year period.

Year	New houses built on brown-field sites
1995	20
2000	34
2005	64
2010	108
2015	140

(i) In which 5-year period was there the biggest increase in the use of brown-field sites?

_____ to _____ [1]

(ii) What was the percentage increase in the use of brown-field building sites in the 20-year period?

(Show your working out.)

Answer _____ % [2]

(iii) Explain fully how the use of brown-field sites helps promote biodiversity.

_____

_____

_____ [2]

(c) Nature reserves can also help promote biodiversity.
State **one** way in which nature reserves can help increase biodiversity.

_____ [1]

Examiner Only	
Marks	Remark

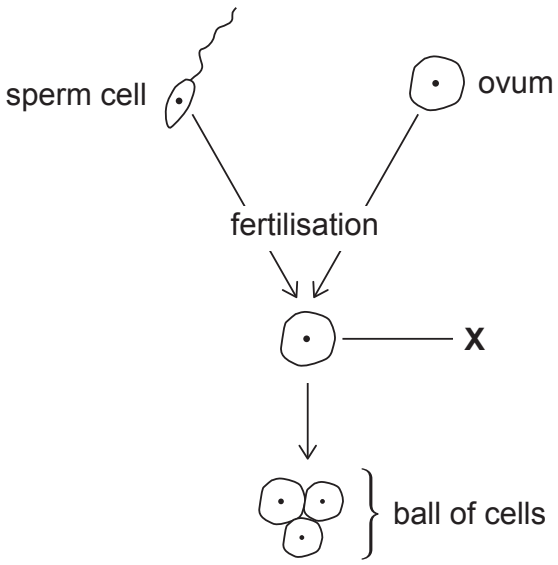
Examiner Only	
Marks	Remark

6 **(a)** Name the part of the female reproductive system where:

- ova are produced _____.
- fertilisation takes place _____.

[2]

(b) The diagram below represents the process of fertilisation in humans.



(i) What term is used to describe the cell labelled **X** in the diagram?

_____ [1]

(ii) The sperm and ovum are described as being haploid. What is meant by the term haploid?

_____

_____ [1]

(iii) How many diploid cells are shown in the diagram?

_____ [1]

Examiner Only

Marks	Remark

7 **(a)** Many people are able to taste the chemical PTC. This chemical is detected by small structures in the taste buds of the tongue, that if stimulated cause neurones to send a nerve impulse to the brain.

(i) Name the structures in the taste buds that can detect taste.

_____ [1]

(ii) Name the part of the central nervous system **not** involved in the process of tasting described above.

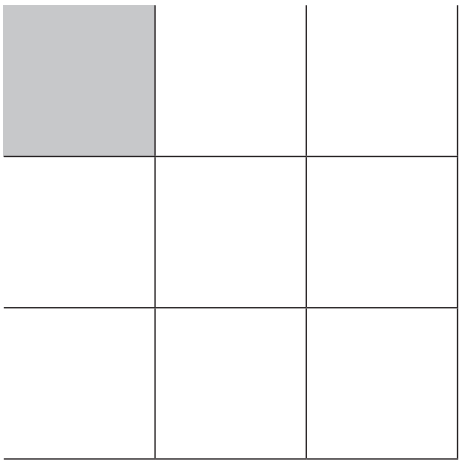
_____ [1]

(b) The ability to taste PTC is controlled by a dominant allele (T) with the recessive allele (t) coding for non-tasting.

(i) State the genotype of a heterozygote taster.

_____ [1]

(ii) Complete the Punnett square to show the genotypes of offspring produced by a heterozygote taster and a non-taster.



[2]

(iii) Assuming that equal numbers of boys and girls are born, what is the probability that a child born to these parents will be a girl who can taste PTC?

_____ [1]

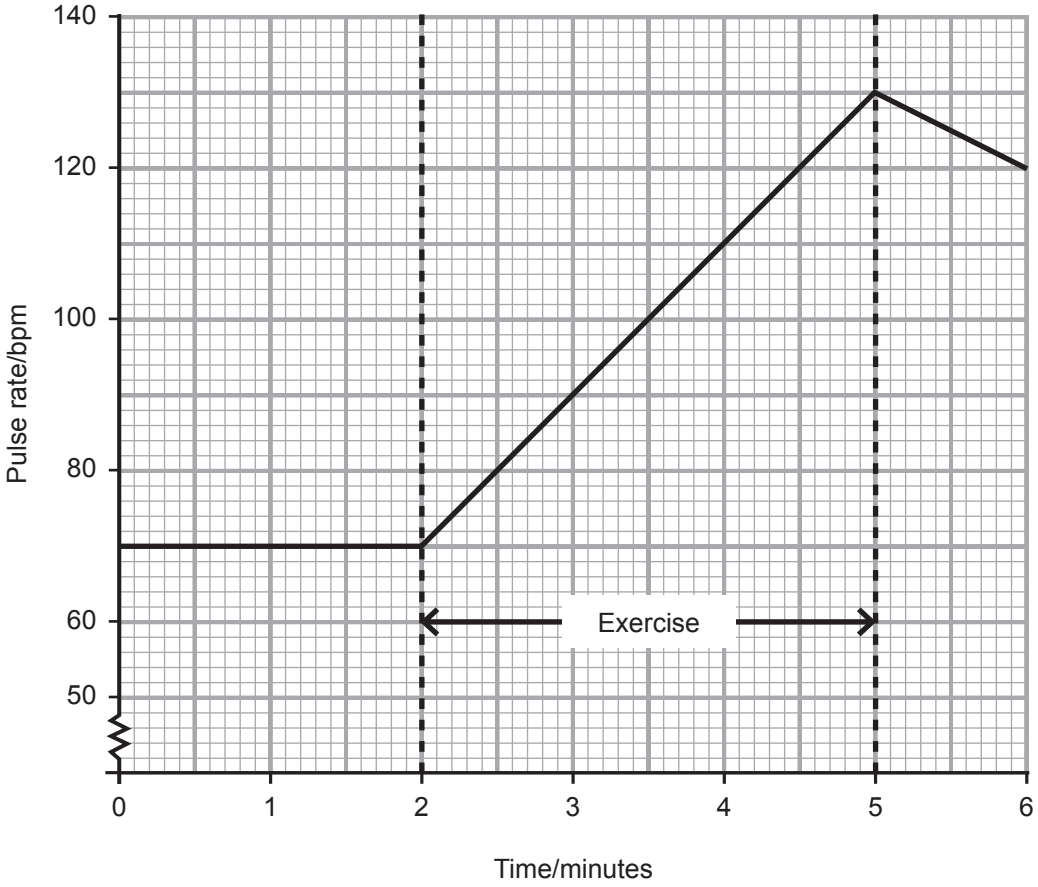
Examiner Only	
Marks	Remark

8 Respiration is a process that releases energy in body cells.

(a) Complete the balanced symbol equation for respiration.

$C_6H_{12}O_6 + 6O_2 \rightarrow$ _____ + _____ + energy [2]

(b) The graph below shows the effect of exercise on pulse (heart) rate.



(i) Calculate the rate of increase of pulse rate in bpm/minute during the exercise.

(Show your working out.)

Answer _____ bpm/min [2]

(ii) Explain fully why the pulse rate increases during exercise.

_____

_____

_____

_____

_____ [3]

(c) Give **one** way in which exercise benefits the heart.

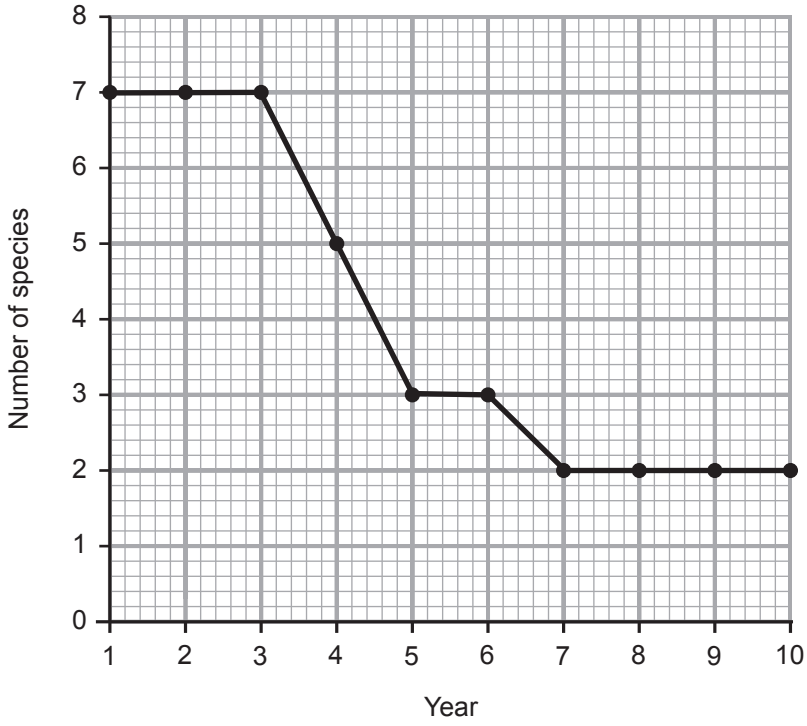
_____ [1]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

9 **(a)** Apart from grass, the only species of plants able to grow in regularly cut lawns are those that grow very close to the ground such as daisies and buttercups. 'Tall' plants get cut by lawnmowers and don't get a chance to grow.

The number of species found in one newly-sown lawn was counted every June for a ten-year period. The results are shown in the graph below.



(i) Describe fully the trend shown by these results.

_____

_____

_____ [2]

(ii) During this ten-year period the house owner bought a new lawnmower that was able to cut much closer to the ground. Suggest when this may have happened.

_____ [1]

(iii) Suggest why it was important to count the number of species at the same time each year.

_____ [1]

Examiner Only	
Marks	Remark

(b) Change in the number of species in an area is often the result of natural selection.
In terms of natural selection, explain the change in species number in this lawn.

[3]

(c) Explain the difference between an endangered and an extinct species.

[2]

THIS IS THE END OF THE QUESTION PAPER