



Rewarding Learning

General Certificate of Secondary Education

Centre Number

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Candidate Number

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Single Award Science: Biology

Unit 1

Higher Tier



[GSA12]

GSA12

Assessment

TIME

1 hour.

Assessment Level of Control:

Tick the relevant box (✓)

Controlled Conditions	
Other	

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 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 **9(a)**.



- 1 The Amazon rainforest is described as the 'lungs of the planet' because the trees remove carbon dioxide from the atmosphere and release oxygen.

- (a) Name the process carried out by trees that removes carbon dioxide from the atmosphere and releases oxygen.

_____ [1]

- (b) The rainforest has high biodiversity because it provides many habitats for a wide range of species. Deforestation clears the land for farmers to grow grass and raise cows. This allows local people to earn a living. Much of the deforestation is carried out by lighting fires which often spread over large areas. These fires completely remove millions of acres of forest.

- (i) Suggest **two** disadvantages of clearing the rainforest by burning.

1. _____

2. _____

_____ [2]

- (ii) Suggest **one** advantage of clearing the rainforest by burning rather than by cutting down the trees.

_____ [1]

Much of the Amazon rainforest has been made into a nature reserve.

- (c) Give **two** advantages of making an area into a nature reserve.

1. _____

2. _____

_____ [2]





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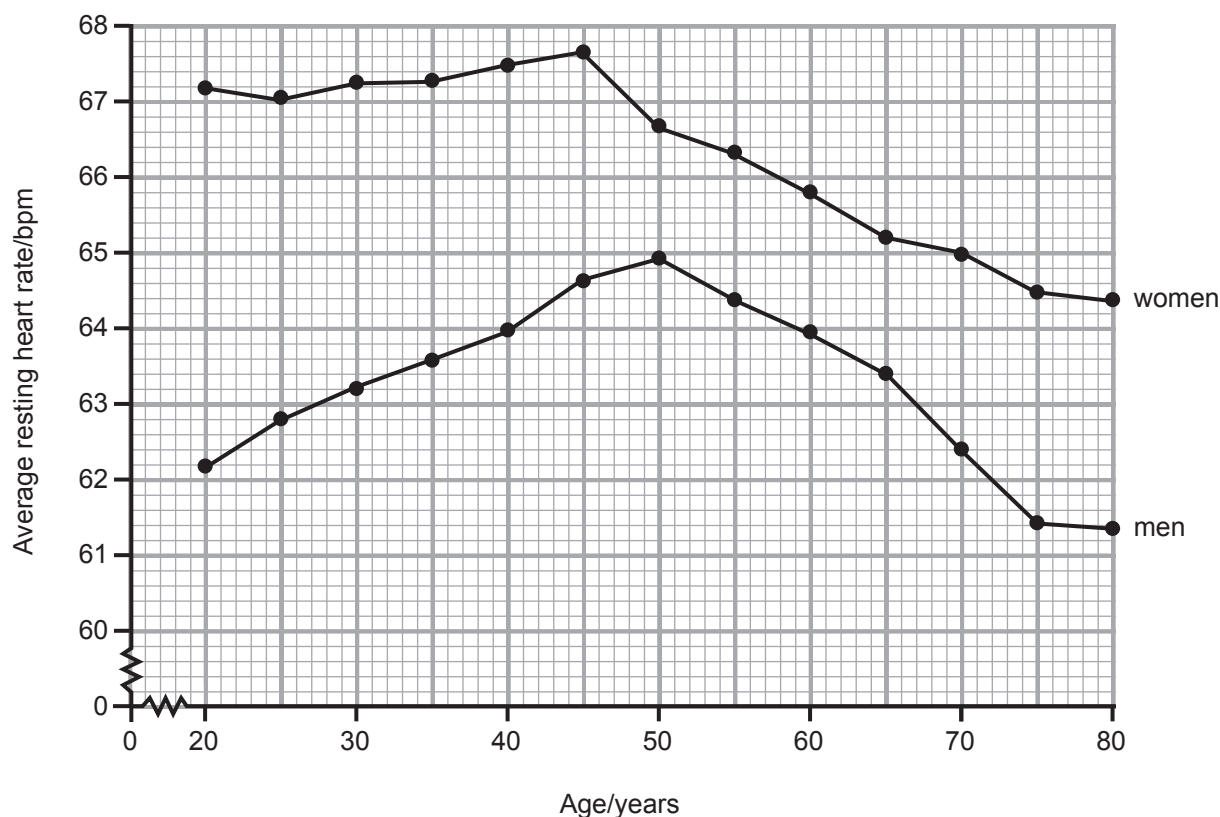
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(Questions continue overleaf)



- 2 (a) Research involving 4 million people worldwide was carried out to investigate the resting heart rate for men and women at different ages.

The graph below shows the results.



- (i) Describe fully the trend shown by this information for **women**.

_____ [2]

- (ii) Give **one** difference in the average resting heart rate of men compared to women.

_____ [1]

- (iii) Give **one** reason why the results of this investigation are reliable.

_____ [1]



- (b) Calculate the difference in the average resting heart rate for **men** aged 20 and **men** aged 40.

(Show your working out.)

_____ bpm [2]

Resting heart rate is measured when a person is not exercising.

- (c) Suggest what, if anything, will happen to a person's heart rate when they are exercising. Explain your answer.

_____ [2]

[Turn over



3 Penicillin is an example of an antibiotic.

(a) Name the scientist who discovered penicillin.

_____ [1]

Katie and Sarah are identical twins and they are both unwell. Katie has the flu and Sarah has TB (tuberculosis).

(b) Explain fully why a doctor would prescribe antibiotics for Sarah but **not** for Katie.

_____ [2]

(c) Before drugs such as antibiotics can be given to patients, they must be tested. The first stage is in vitro testing.

(i) What is **in vitro** testing?

_____ [2]

(ii) Clinical trials involve testing drugs on volunteers. Give **two** reasons why clinical trials are carried out.

1. _____

2. _____
_____ [2]



- 4 Zebra mussels are a competitive invasive species that have been found in Strangford Lough and Lough Neagh. They produce a sticky substance that allows them to attach to hard surfaces such as rocks and the bottom of boats.



© Ted Kinsman / Science Photo Library

- (a) Give **two** characteristics of **all** competitive invasive species.

1. _____
2. _____ [2]

- (b) Suggest **one** way that humans have helped bring zebra mussels to Northern Ireland.

_____ [1]

- (c) Suggest **one** action that could be taken at the ports and harbours in Northern Ireland to prevent the spread of zebra mussels.

_____ [1]

[Turn over



5 The human body has the following specialised parts.

organ systems : **organs** : **cells** : **tissues**

(a) Put these parts in order of **increasing** size.

The first one has been completed for you.

cells			
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[1]

Stem cells are simple cells that can be used to treat disease.

(b) Give **two** risks involved in the use of stem cells to treat disease.

1. _____

2. _____

[2]



Stem cells can be collected from human embryos or adult bone marrow.
The table below gives information about both types of stem cell.

Stem cells from human embryos	Stem cells from adult bone marrow
Costs start from £5000 to collect a few cells.	Costs start from £1000 to collect many cells.
There are ethical issues in using embryo stem cells.	Adults give permission for their own bone marrow to be collected.
The stem cells can develop into most other types of cell.	The stem cells can develop into only a few types of cell.
Each stem cell divides every 30 minutes.	Each stem cell divides every four hours.
These stem cells can grow irregularly so more research is needed.	Use of these stem cells is considered to be a safe procedure.

Source: Principal Examiner

(c) Using only the information in the table, give **two** advantages of using stem cells from human embryos rather than stems cells from adult bone marrow.

1. _____
2. _____ [2]

[Turn over



6 (a) In rabbits the allele for black fur (B) is dominant over the allele for white fur (b).

(i) Complete the Punnett square below to show the cross between a heterozygous black rabbit and a white rabbit.

[2]

(ii) This pair of rabbits produce 24 kittens (baby rabbits). Calculate the number of kittens that are expected to be **white**.

(Show your working out.)

[2]



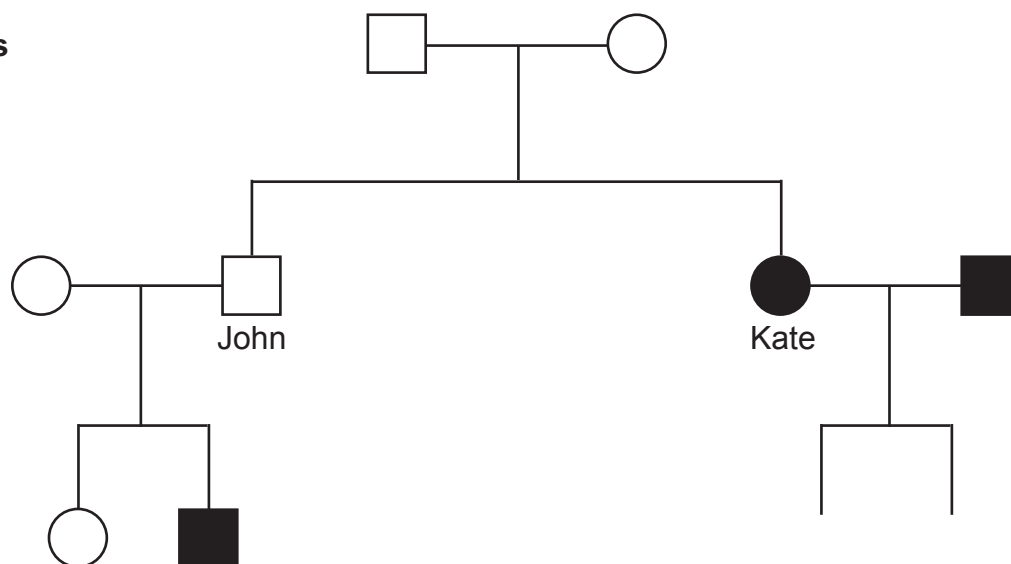
- (b) The pedigree diagram below shows the inheritance of a genetic disease caused by a recessive allele.



Grandparents

Parents

Children



- (i) Kate has two children, a son and a daughter. Complete the pedigree diagram above to show whether her children have inherited the genetic disease or not. [2]
- (ii) What conclusion can be made about the genotypes of the grandparents in this pedigree diagram? [1]

[Turn over



- 7 Farmers often spray the edges of their fields with chemicals to clear flowers and weeds.

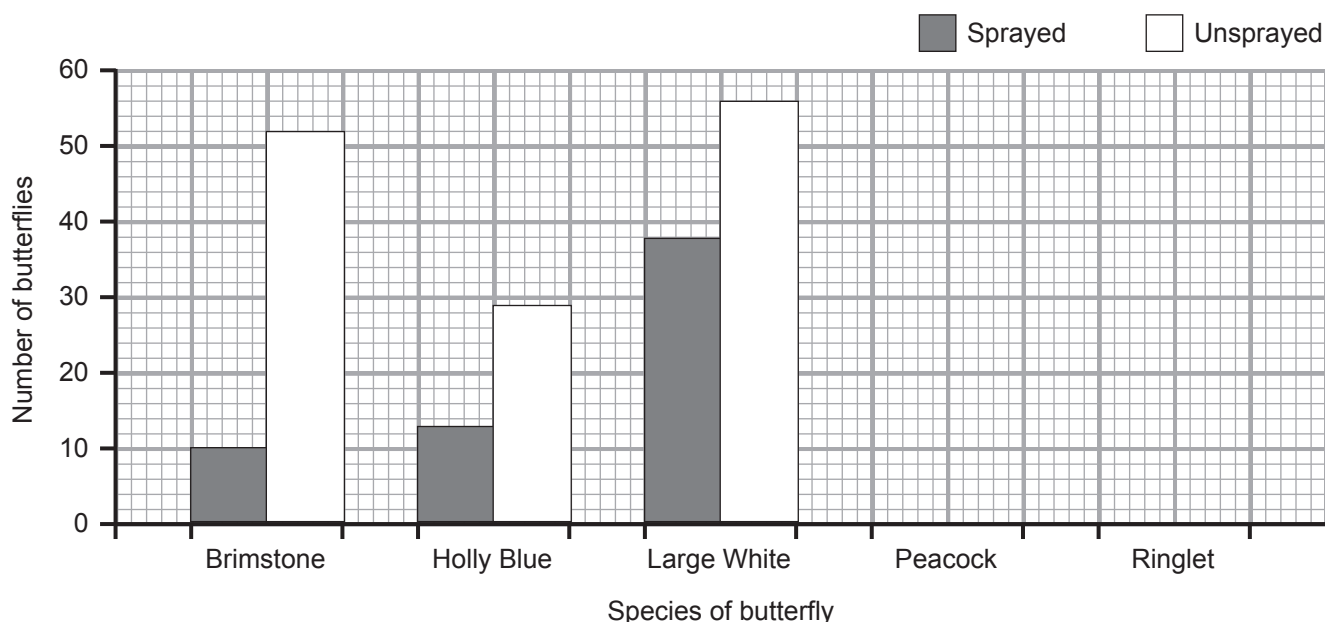
This can affect butterflies because they feed on nectar from these plants.

To investigate the effect one area was sprayed with chemicals and another, of equal size, was left unsprayed. Two weeks later the number of butterflies in each area was counted.

The results are shown below.

Species of butterfly	Number of butterflies in each area	
	Sprayed with chemicals	Unsprayed (no chemicals)
Brimstone	10	52
Holly Blue	13	29
Large White	38	56
Peacock	16	39
Ringlet	20	52

- (a) (i) Complete the bar chart below to show this information.



[2]



- (ii) Name the species of butterfly that is most affected by spraying with chemicals.

_____ [1]

- (iii) Give **one** reason why a valid comparison can be made between the number of butterflies in each area.

_____ [1]

The chemicals that were sprayed are called herbicides, these **only** kill flowers and weeds.

- (b) Describe and explain the effect that spraying these herbicides had on the number of butterflies.

_____ [3]

Herbicides are an abiotic factor.

- (c) What is meant by the term **abiotic**?

_____ [1]

[Turn over



8 Fossils can be used to show how organisms have changed over time.

(a) Explain fully what is meant by the term **fossil**.

[2]

(b) Evolution is the gradual change in a species over time.

(i) Name the scientist who developed the Theory of Evolution.

[1]

(ii) Explain fully how the process of natural selection may lead to evolution.

[3]

(c) Fossils are evidence of extinct organisms. What is meant by the term **extinct**?

[1]





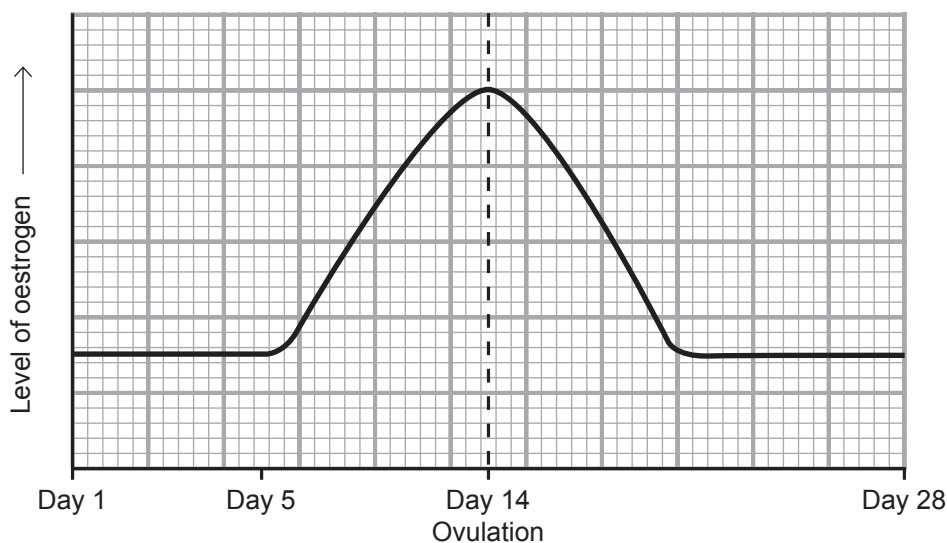
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- 9 The graph below shows the change in the level of oestrogen during the menstrual cycle. Oestrogen is a female hormone.



- (a) Describe the level of oestrogen over the first 14 days and explain the effect this has on the menstrual cycle.

Your answer should also include:

- the name of **one** other female hormone and its role in the menstrual cycle.

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



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For Examiner's
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Question Number	Marks
1	
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Total Marks	
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Examiner Number

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