

New
Specification



Centre Number

| | |
|----|--|
| 71 | |
|----|--|

Candidate Number

| |
|--|
| |
|--|

General Certificate of Secondary Education
2012–2013

Science: Single Award

Unit 1 (Biology)

Higher Tier

[GSS12]

MONDAY 27 FEBRUARY 2012

9.30 am–10.45 am



TIME

1 hour 15 minutes.

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 75.

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 questions **2(a)** and **7(a)**.

For Examiner's
use only

| Question Number | Marks |
|-----------------|-------|
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | |
| 6 | |
| 7 | |
| 8 | |
| 9 | |

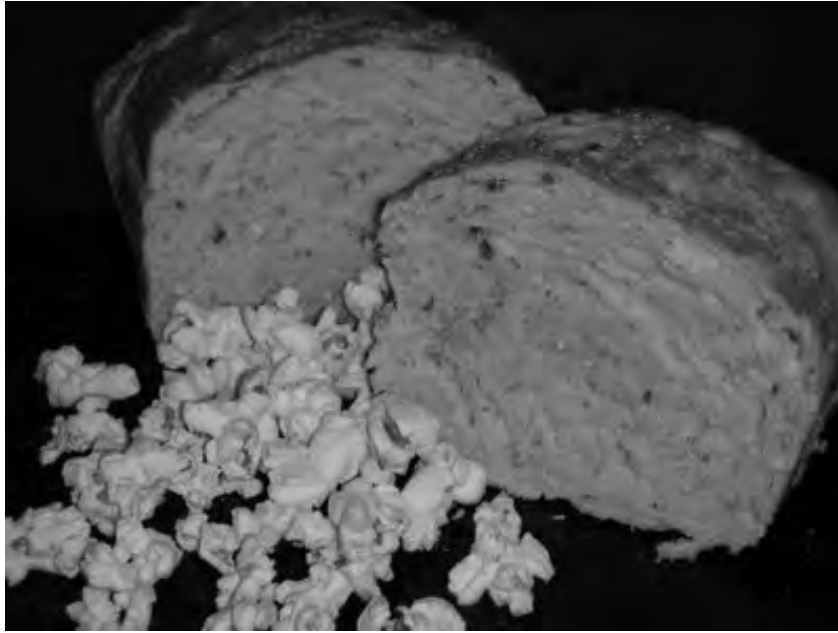
Total
Marks

| |
|--|
| |
|--|



BLANK PAGE

2 (a) Below is a picture of bread and popcorn.



Describe an experiment to find which of these foods contains the most energy. All common laboratory equipment including thermometers and boiling tubes is available. Your answer should include how you make your results valid (fair test) and also reliable.

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

[6]

| Examiner Only | |
|---------------|--------|
| Marks | Remark |
| | |

- (b) A doctor has to decide which of three different brands of iron supplements (A, B or C) to prescribe to his patients. He collected facts about each brand and the table below shows his findings.

Key

High = 3

Low = 1

| Brand | Number of side effects | Swallowing problems | Cost per unit |
|-------|------------------------|---------------------|---------------|
| A | 3 | 3 | 2 |
| B | 3 | 2 | 3 |
| C | 2 | 1 | 3 |

- (i) Analyse the facts for each brand and state which one he should prescribe. Referring to each brand fully explain your choice.

[3]

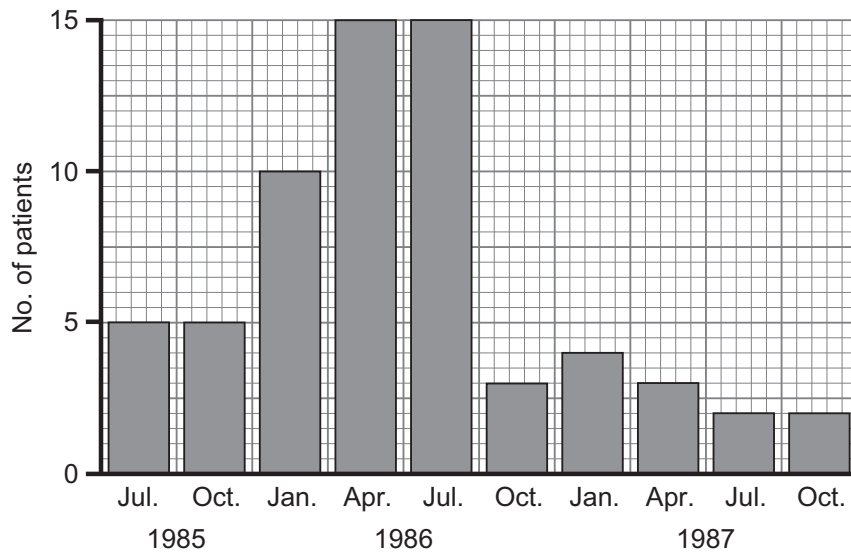
- (ii) Suggest **one** other fact about each brand that he should consider before making his decision.

[1]

Examiner Only

Marks Remark

- 3 (a) The bar chart shows the number of patients who caught MRSA in a hospital between July 1985 and October 1987. Part of their treatment involved antibiotics.



Source: National Institutes of Health

- (i) Suggest when the hospital started to take measures to control the spread of MRSA. Explain your answer.

_____ [2]

- (ii) What is the evidence in the graph that suggests that MRSA bacteria are resistant to antibiotics?

_____ [1]

| Examiner Only | |
|---------------|--------|
| Marks | Remark |
| | |

| Examiner Only | |
|---------------|--------|
| Marks | Remark |
| | |

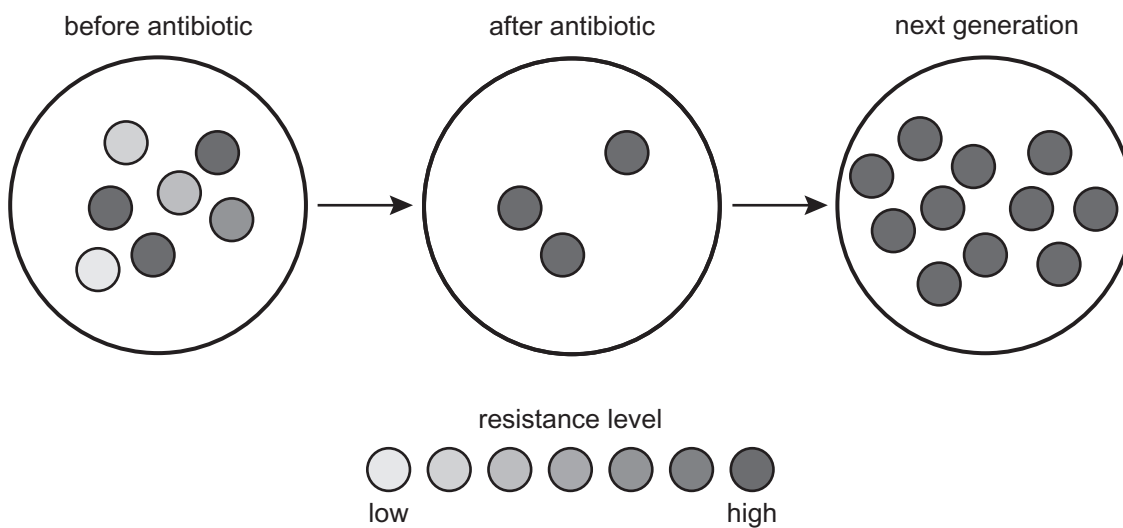
(b) (i) One of the measures to control the spread of MRSA is to put infected patients into isolation wards. Suggest a reason why this method is not widely used in hospitals.

[1]

(ii) Apart from isolation describe **one** measure that controls the spread of MRSA and suggest why it is effective.

[2]

(c) MRSA is caused by a type of skin bacteria becoming resistant to antibiotics. The diagram below shows how this would have happened.

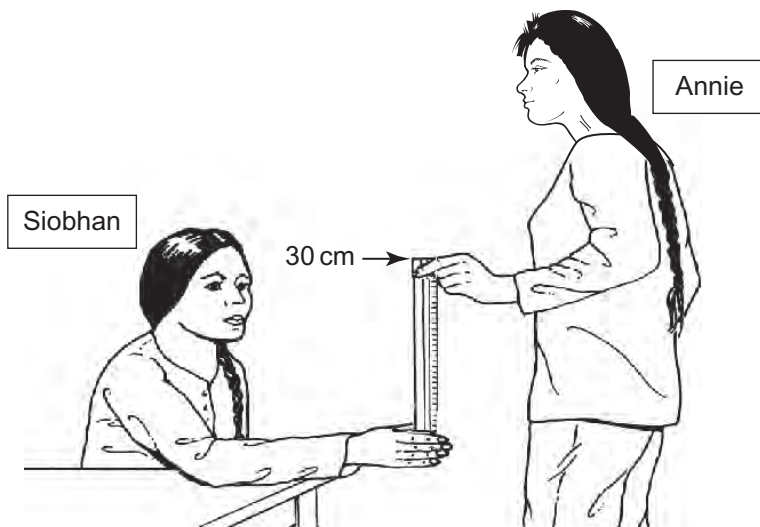


Use the diagram and your knowledge to explain how the population of skin bacteria became resistant.

[3]

- 4 (a) The pupils in the drawing below are investigating how practice affects the speed of a voluntary action.

Siobhan has to catch the ruler after Annie drops it.



© Science at Work by L Mooney and A Rivers, published by Longman Publishers, 1992. ISBN 0582078245. Further duplication other than for teaching and study is prohibited – Pearson Education Ltd, copyright holders.

Below are the results for this investigation.

| | | | | | | |
|------------------|----|----|----|----|----|----|
| Try | 1 | 2 | 3 | 4 | 5 | 6 |
| Ruler reading/cm | 29 | 25 | 22 | 28 | 16 | 13 |

- (i) Give a trend for these results.

_____ [1]

- (ii) The pupils think that one of the results is incorrect. State which result this is and give a reason for your answer.

_____ [1]

- (iii) Apart from the ruler being held at 30 cm for each try, suggest one other factor that has to be kept the same to make this test valid.

_____ [1]

Examiner Only

Marks Remark

(iv) What would have to be done in this investigation to reliably conclude that practice speeds up peoples' reactions?

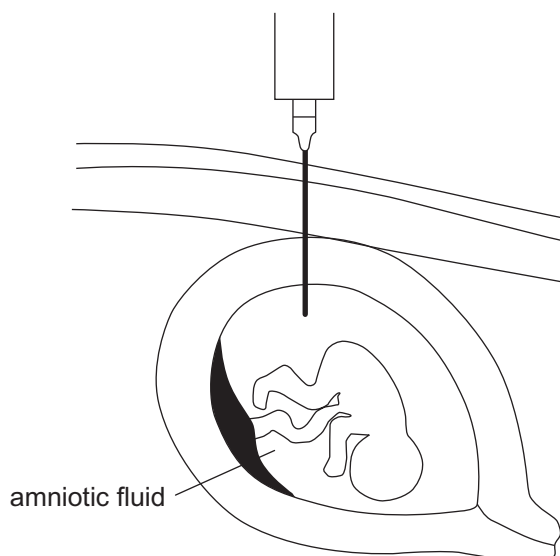
_____ [1]

(b) State **two** ways that voluntary actions differ from reflex actions.

_____ [2]

| Examiner Only | |
|---------------|--------|
| Marks | Remark |
| | |

- 5 (a) The amniocentesis test shown below is an example of genetic screening.



© GCSE Single Award Science for CCEA by T Laverty, J Napier & R White, published by Hodder Education 2006. ISBN 978 0340 926000. "Reproduced by permission of Hodder Education".

Some of the amniotic fluid is drawn up into the syringe and analysed in a laboratory.

- (i) Suggest what is in the amniotic fluid that is analysed during genetic screening.

[2]

- (ii) Explain why amniocentesis testing may cause an increase in the number of people seeking abortions.

[2]

| Examiner Only | |
|---------------|--------|
| Marks | Remark |
| | |

(b) Life insurance companies have a financial interest in an individual's general health. Fully explain how and why someone with an inherited disease might be disadvantaged by these companies.

[3]

| Examiner Only | |
|---------------|--------|
| Marks | Remark |
| | |

- 6 (a) The willow shown below is being grown by a farmer to reduce the use of oil for fuel.



© US Forest Service/John Stanturf

- (i) Suggest **two** ways that this is an example of sustainable development.

[2]

- (ii) Suggest **two** ways that growing large numbers of willow plants might cause some other plants to become endangered.

[2]

| Examiner Only | |
|---------------|--------|
| Marks | Remark |
| | |

- (b) The picture below was taken at Rostrevor Oakland Nature Reserve which is a woodland on a steep slope overlooking Carlingford Lough.



© Crown copyright <http://www.doeni.gov.uk/niea>

This woodland dates from the 1780s and has a wide range of native species. These include mature oaks, ash, hazel, holly and wild cherry and the ground vegetation consists mostly of woodrush, wild garlic and bluebells. There are also insects, particularly butterflies, woodland birds such as blackcaps, willow warblers, chiffchaffs, jays, buzzards and mammals such as red squirrels.

- (i) Suggest a reason why this area has existed as a woodland for so long.

[1]

- (ii) Explain fully why this woodland was chosen to be a nature reserve.

[3]

| Examiner Only | |
|---------------|--------|
| Marks | Remark |
| | |

(iii) Give **two** ways that species are protected by living in a nature reserve.

[2]

| Examiner Only | |
|---------------|--------|
| Marks | Remark |
| | |

- 7 (a) Explain fully the main difference between active and passive immunity. Suggest an advantage and disadvantage for each type.

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

[6]

- (b) Sometimes diseases spread rapidly in a short period of time and become epidemics.

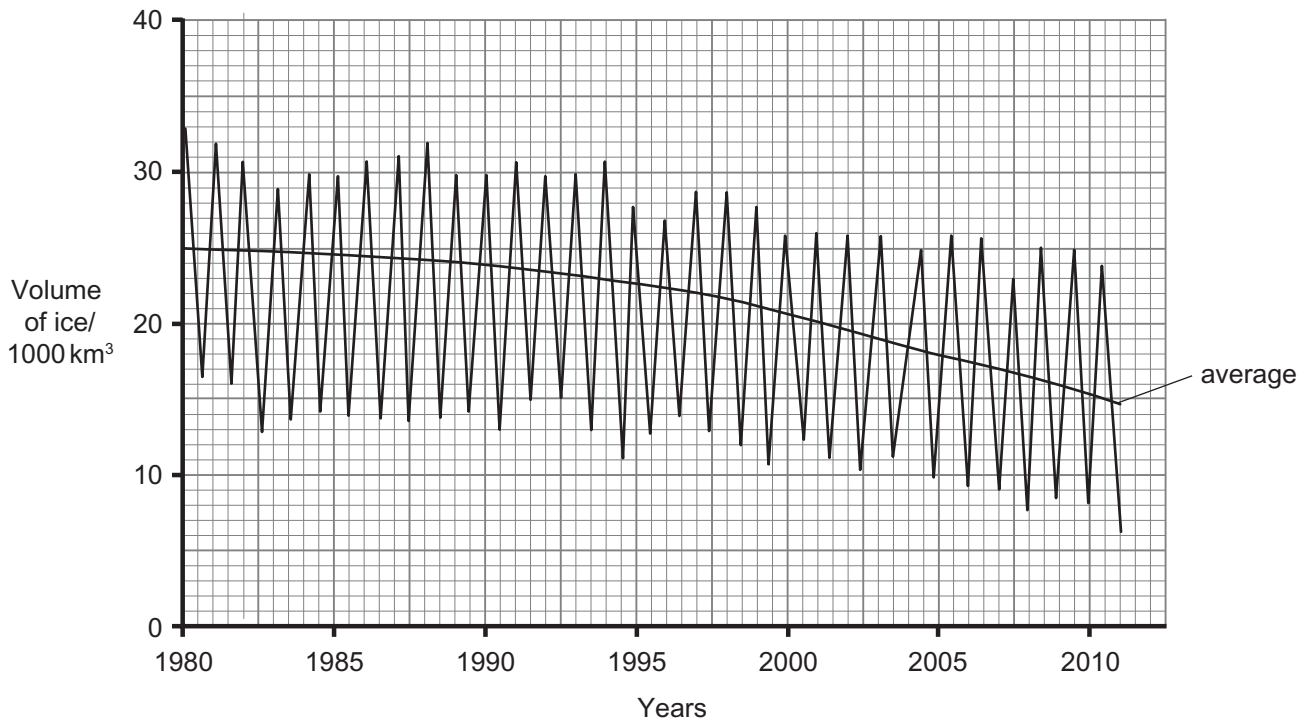
Explain fully why epidemics are more likely to happen when the disease is caused by microbes that are more likely to mutate.

[3]

| Examiner Only | |
|---------------|--------|
| Marks | Remark |
| | |

- 8 (a) The graph below shows the changes in the volume of the ice fields in the Arctic Circle. This data was obtained by many scientists analysing many thousands of images of the Arctic Circle obtained from satellites.

Arctic Sea Ice Volume



- (i) The graph shows changes in the volume of ice over time. Describe and explain fully the change **within each year**.

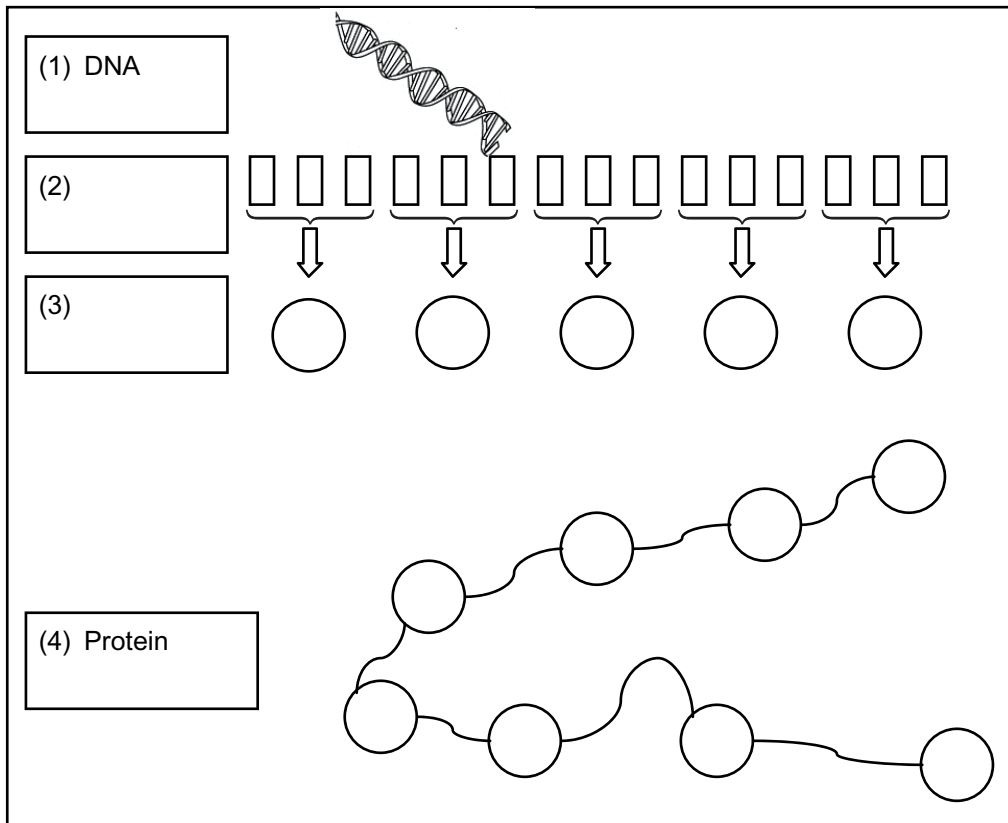
[2]

- (ii) State fully the trend shown by this graph.

[2]

| Examiner Only | |
|---------------|--------|
| Marks | Remark |
| | |

- 9 (a) The diagram shows how DNA codes for protein. Complete the diagram by labelling layers 2 and 3 in the respective boxes.



[2]

- (b) State the name of the hypothesis which explains how DNA codes for proteins.

_____ [1]

- (c) (i) The structures in layer 2 can become out of order due to a mutation.

Describe and explain the effect of this.

 _____ [2]

- (ii) Complete the sentence below.

Mutations can be caused by environmental factors, e.g.

_____ from the Sun can

cause _____ . [2]

| Examiner Only | |
|---------------|--------|
| Marks | Remark |
| | |

THIS IS THE END OF THE QUESTION PAPER

Permission to reproduce all copyright material has been applied for.
In some cases, efforts to contact copyright holders may have been unsuccessful and CCEA
will be happy to rectify any omissions of acknowledgement in future if notified.