



Rewarding Learning

General Certificate of Secondary Education
2009–2010

Centre Number

71	
----	--

Candidate Number

--

Science: Single Award (Modular)

Human Activity and Health

Module 2

Higher Tier

[GSC22]



GSC22

THURSDAY 20 MAY 2010, AFTERNOON

TIME

45 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 six** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 45.

Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

For Examiner's use only

Question Number	Marks
1	
2	
3	
4	
5	
6	

Total Marks

--

BLANK PAGE

1 The body has a number of layers of defence against disease.

(a) Complete the table to show how some parts of the body protect against microbes.

Body part	Way in which it helps protect against microbes
Skin	
Mucous membranes	

[2]

(b) Describe what a vaccine is, and explain how it works.

[3]

Examiner Only	
Marks	Remark

- 2 (a) Smoking tobacco, drinking alcohol and the misuse of drugs causes harm to people and society. The following table compares the effects of these substances on individuals.

Key Most effect = 3
Least effect = 1

Substance	Can cause mental health problems	Can cause road traffic accidents	Can cause cancer
Tobacco	1	1	3
Alcohol	3	3	2
Cannabis	2	2	1

- (i) Tobacco and alcohol can legally be used by adults, but cannabis remains an illegal drug. Use the information in the table to explain how campaigners could suggest that taking cannabis should be made legal.

_____ [2]

- (ii) Suggest why it is illegal for children to purchase cigarettes and alcohol, but legal for adults.

_____ [1]

- (iii) Name the substance in tobacco smoke that:

1. is addictive _____ [1]

2. causes cancer _____ [1]

Examiner Only	
Marks	Remark

- (b) The following table shows the pattern of drinking of three teenagers over a seven day period. The values show the number of alcoholic units taken.

	Mon	Tue	Wed	Thurs	Fri	Sat	Sun	Total
John	1	2	3	2	2	2	0	
Tony	0	0	2	0	0	8	0	
Paul	0	0	0	0	2	2	0	

- (i) Complete the table to show the total number of units each teenager had taken during the week. [1]

- (ii) Name the teenager who was binge drinking.

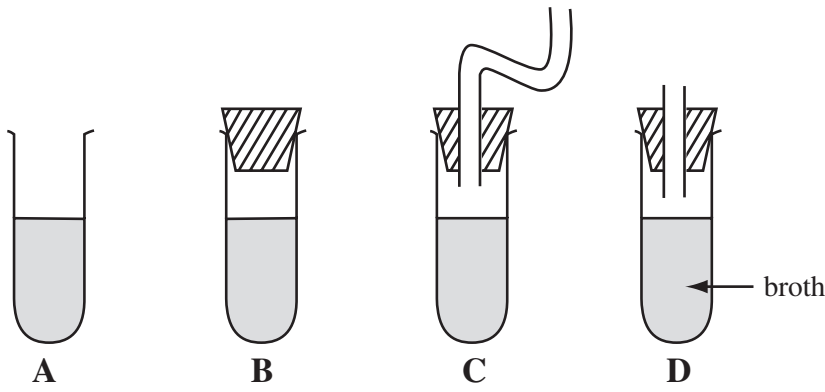
_____ [1]

- (iii) Suggest **two** reasons why the Government recommends that people do not binge drink.

_____ [2]

Examiner Only	
Marks	Remark

3 (a) Jane carried out the following investigation.



The apparatus and the broth were sterilised before the investigation and the experiment was left for a period of time.

(i) Which tube(s) (**A**, **B**, **C** or **D**) will contain contaminated broth after a period of time?

_____ [1]

(ii) Name one **type** of organism that could have caused contamination in the broth.

_____ [1]

(iii) Name the scientist who used similar apparatus to investigate contamination.

_____ [1]

Examiner Only	
Marks	Remark

(iv) Place a tick in the table below to identify what Jane must do to obtain valid results.

Action	Tick if essential to give valid results
Same volume of broth used in all tubes	
Same type of broth used in all tubes	
Tubes kept in the fridge during the investigation	
Tubes kept in bright light during the investigation	
Tubes kept at the same temperature during the investigation	
Tubes left for the same length of time during the investigation	

[2]

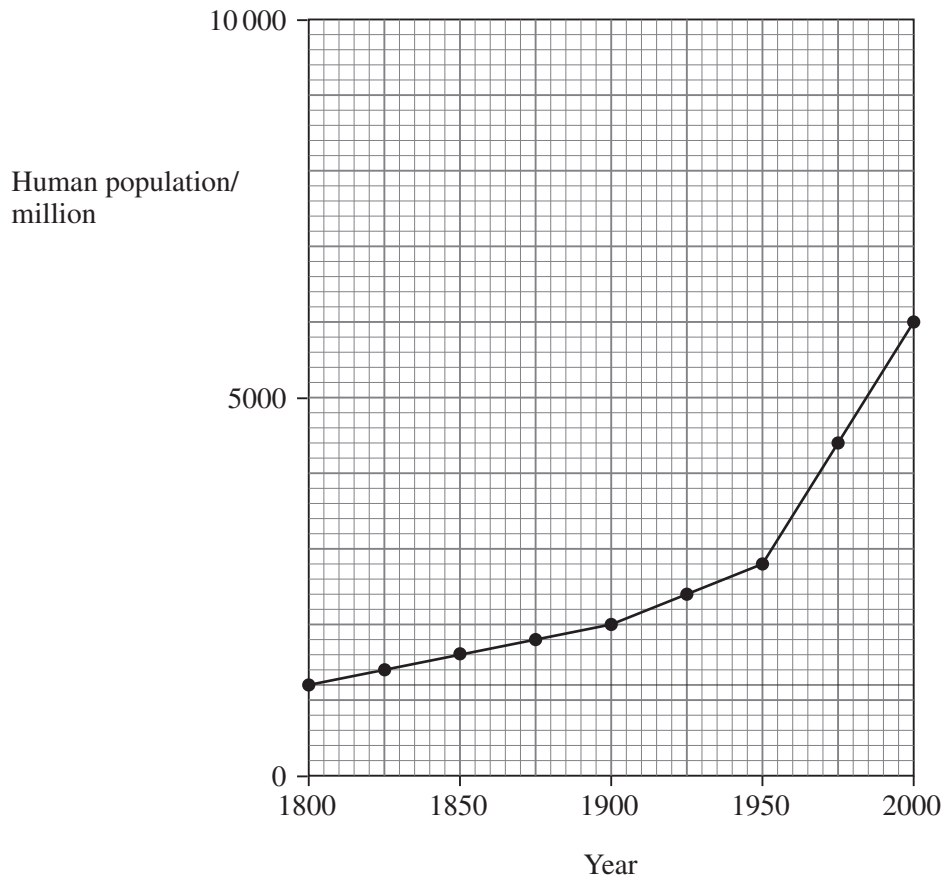
(b) Explain fully what is meant by the term **aseptic technique**.

[2]

Examiner Only

Marks Remark

- 4 (a) The following graph provides information about human population growth.



- (i) Calculate the increase in population between 1900 and 2000.

_____ [1]

Examiner Only	
Marks	Remark

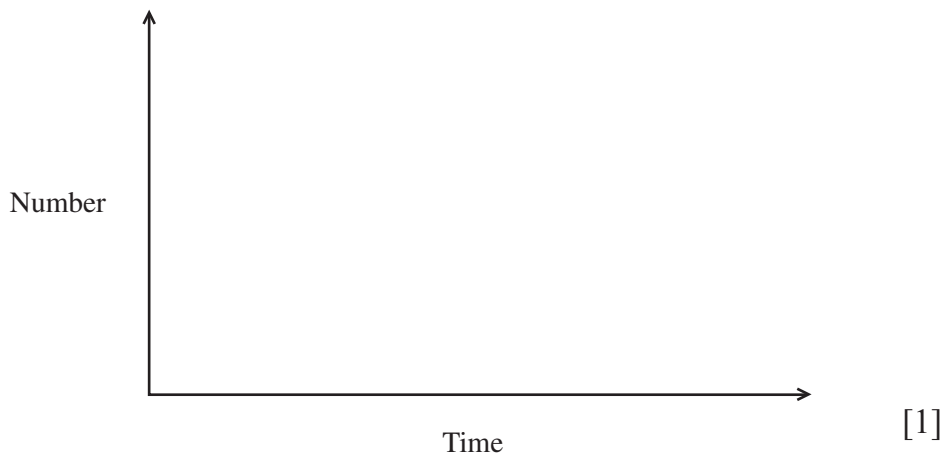
The following table shows significant dates in human medical advances.

Human medical advances	Dates
First heart transplant	1960–70
The use of anaesthesia (pain relief) in surgery	1840–50
Development of first antibiotics	1940–50

- (ii) Suggest which of these medical developments had the greatest effect on population growth. Explain your answer.

_____ [2]

- (b) (i) Sketch a line on the axes below to show how the number of a competitive invasive species, e.g. zebra mussel, normally changes over time when introduced into a new area.



- (ii) Define fully the term **competitive invasive species**.

_____ [2]

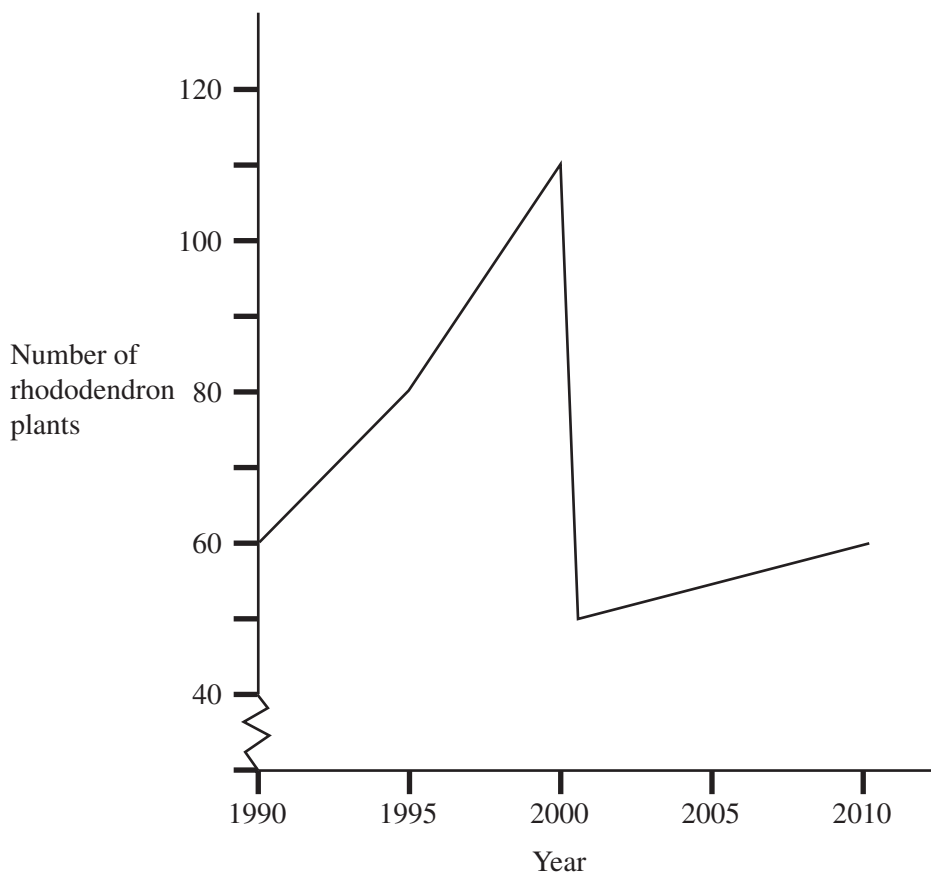
Examiner Only	
Marks	Remark

(c) Rhododendron is another example of a competitive invasive species.



© James Osmond/Alamy

The following graph shows how the number of rhododendron plants in a nature reserve changed over a twenty year period.



The nature reserve was created to conserve a number of delicate orchid species that require high light levels and grow at ground level.

Examiner Only	
Marks	Remark

- (i) Suggest what caused the fall in the number of rhododendron plants around the year 2000.

_____ [1]

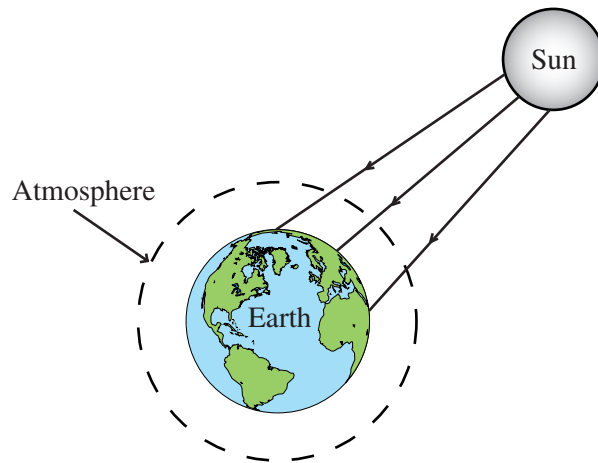
- (ii) Explain fully why it is important to keep the number of rhododendron plants controlled in this nature reserve.

_____ [2]

Examiner Only

Marks Remark

5 The following diagram shows the sun's rays reaching the Earth's surface.



(a) Complete the diagram above to show how some of the sun's rays get trapped by the 'greenhouse blanket', causing global warming. [1]

(b) Describe how a named **abiotic** indicator could be used to monitor the effects of global warming.

[2]

(c) Explain how the destruction of large areas of forest could contribute to global warming.

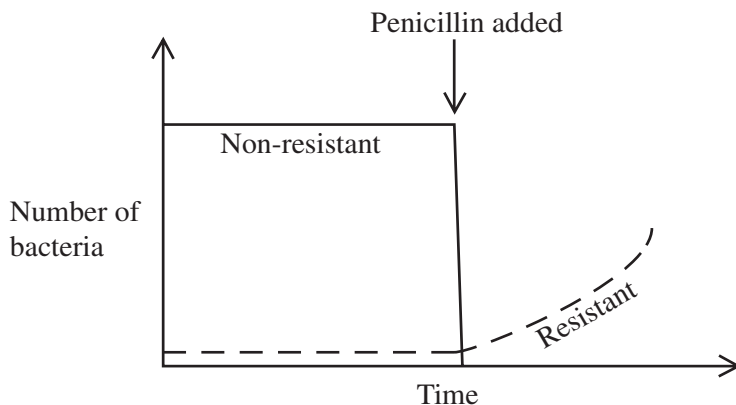
[2]

(d) The Kyoto agreement was intended to reduce global warming. However, it has not been as successful as originally hoped. Give **one** reason why the Kyoto agreement was not as successful as originally hoped.

[1]

Examiner Only	
Marks	Remark

- 6 (a) The following graph shows how the number of resistant and non-resistant bacteria changed in a Petri dish after penicillin was added.



- (i) Describe and explain the changes that took place in the Petri dish after penicillin was added.

[3]

- (ii) Resistant bacteria develop because of mutation. Explain the term **mutation**.

[1]

- (iii) Suggest what other evidence you would need before you could describe the resistant bacteria in the Petri dish as a 'superbug'.

[1]

Examiner Only	
Marks	Remark

- (b) The following table shows some of the costs associated with the development of a particular drug.

Stage	Description	Cost/£ thousand
A	Clinical testing with volunteers	200
B	Licensed for use by the Government	2
C	<i>In vitro</i> testing	500
D	Animal testing	100

- (i) Place the stages (A–D) in the correct order in which they would happen.

_____ [1]

- (ii) The photograph below shows *in vitro* testing.



© Ingram Publishing/Superstock

Suggest **two** reasons why *in vitro* testing is so expensive.

 _____ [2]

- (iii) Suggest **one** reason why a drug could be proved to be effective against a particular disease, yet is not licensed for use.

_____ [1]

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.