



General Certificate of Secondary Education
2010–2011

Science: Single Award (Modular)

Human Activity and Health
Module 2

Higher Tier

[GSC22]

THURSDAY 24 FEBRUARY 2011, MORNING

Centre Number

71

Candidate Number



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.

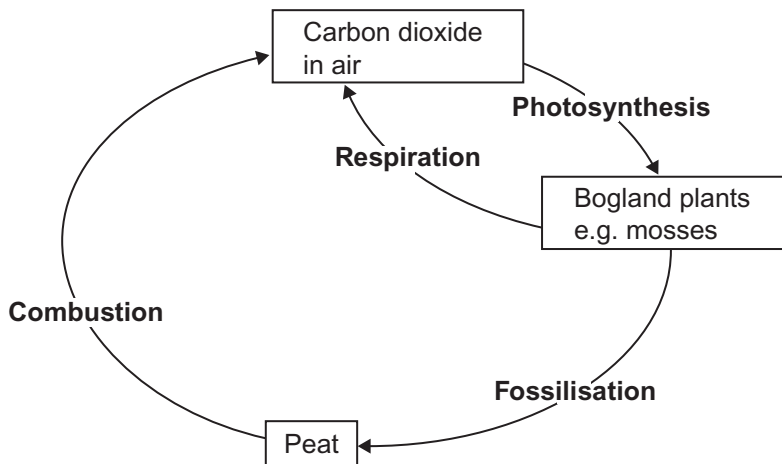
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use only

Question Number	Marks
1	
2	
3	
4	
5	
6	

Total
Marks



1 The following diagram shows the role peat (a fossil fuel) plays in the carbon cycle.



(a) Name **two** processes in the diagram that return carbon dioxide to the air.

_____ and _____ [2]

(b) Using the diagram and your knowledge explain what causes global warming.

 _____ [2]

Another fuel is the willow plant which grows rapidly and can be harvested after three years.

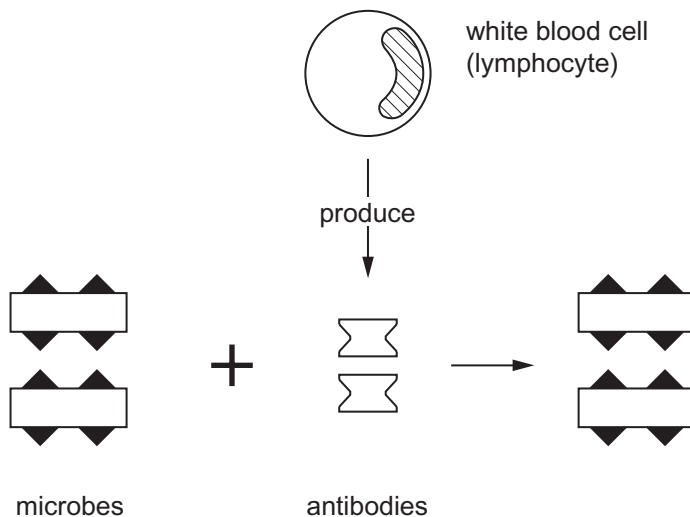
(c) Use the information provided and your knowledge to explain why using willow, rather than peat, is better for the environment.

 _____ [3]

Examiner Only	
Marks	Remark

2 (a) When microbes enter our body some blood cells produce antibodies. The antibodies work by clumping the microbes together and immobilising them. This is called active immunity.

(i) Complete the diagram to show how the antibodies cause the microbes to clump together.



[1]

(ii) Name the process by which the clumped microbes are destroyed.

_____ [1]

(iii) Suggest why we have different antibodies for each type of disease.

_____ [1]

Examiner Only	
Marks	Remark

3 The theory of spontaneous generation proposed that microbes suddenly appeared out of nowhere. However, Louis Pasteur conducted an experiment around 1860 that proved this was incorrect. He showed that contamination could only occur if microbes could gain access to food or drink.

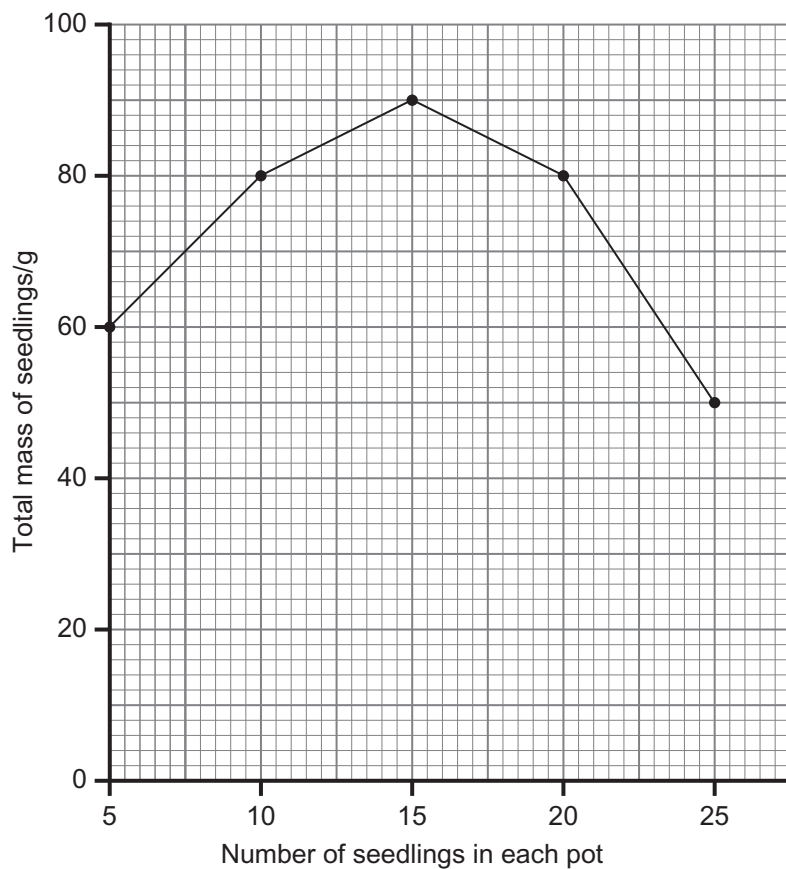
Describe and explain how Pasteur showed that contamination could only occur if microbes could gain access to food or drink.

(You may use diagrams in your answer.)

[4]

Examiner Only	
Marks	Remark

- 4 (a) Joanna investigated how the number of cress seeds planted in a pot affected the mass of the seedlings. Her teacher gave her five plant pots and a packet of seeds. After planting the seeds she left the plants for three weeks. After weighing the seedlings Joanna plotted the following graph.



- (i) Use the information in the graph to complete the table below.

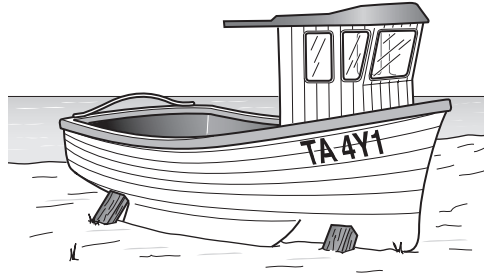
Number of seedlings in each pot	Average mass of each seedling/g
5	
10	8
15	6
20	4
25	2

[1]

Examiner Only

Marks Remark

- 5 (a) Fish stocks of cod and other popular species around the British Isles have suffered a sharp fall in recent decades due to over-fishing. One way to help conserve fish stocks is the decommissioning of some boats in the fishing fleets. In many decommissioning schemes owners of fishing boats are able to apply for compensation in return for the scrapping of their boats and the surrender of their fishing licence.



- (i) Suggest why it is important that owners surrender their fishing licence as well as scrapping their boat as part of the scheme.

_____ [1]

- (ii) Using large mesh sizes in fishing nets is another strategy for conserving fish stocks. Explain fully how this helps conserve fish stocks.

_____ [2]

- (b) Fish stocks of inland waterways (rivers, lakes) can also be harmed by over-fishing, but are also at risk due to pollution. However, progress is being made as some types of pollution are being reduced.

- (i) Describe and explain one way in which pollution due to acid rain has been reduced in recent years.

_____ [2]

- (ii) Give **two** reasons how the European Nitrates Directive can reduce pollution of rivers and lakes.

_____ [2]

Examiner Only	
Marks	Remark

- 6 (a) AIDS is a medical condition that results from infection by the HIV virus – at present there is no cure. The HIV virus can be rapidly spread from person to person by a number of methods.

The HIV virus mutates very rapidly ensuring that the body's defences and scientists seeking cures cannot defend effectively against it. The virus evolves so rapidly that it can mutate and become resistant to a particular drug within a very short time and even during a course of drug treatment for a particular patient – the drug resistant strains survive and multiply as the non-resistant strains are eliminated.

- (i) Use the information provided and your knowledge to explain how the development of drug resistance in AIDS demonstrates natural selection and evolution.

Natural selection _____

_____ [2]

Evolution _____ [1]

- (ii) Use the information provided to suggest **one** reason why the spread of AIDS has become a pandemic.

_____ [1]

- (b) The development of drugs to stop or slow down the development of AIDS in a patient is a key method in reducing its effect. Normally treatment involves a combination of different drugs rather than just one type.

- (i) Suggest why a combination of drugs is used rather than a single type of drug.

_____ [1]

- (ii) Some of the drugs used to treat patients with AIDS have very unpleasant side effects. Suggest why these drugs are still licensed and used even though they have unpleasant side effects.

_____ [1]

Examiner Only

Marks Remark

(iii) The first stage in the development of a new drug is *in vitro* testing. What is *in vitro* testing?

_____ [1]

(c) *In vitro* testing of new drugs involves the use of aseptic technique. Aseptic techniques are also essential when culturing microbes in the school laboratory.

(i) Define the term **aseptic technique**.

_____ [1]

(ii) Complete the table below to explain why the following aseptic techniques are used.

Aseptic technique	Reason for technique
Heating the metal loop until red hot before transfer of microbes to Petri dish	
Cooling the metal loop after heating before the transfer of microbes	
Incubating Petri dishes below 30°C	

[3]

THIS IS THE END OF THE QUESTION PAPER

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