**Location Entry Codes**

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As part of CIE's continual commitment to maintaining best practice in assessment, CIE uses different variants of some question papers for our most popular assessments with large and widespread candidature. The question papers are closely related and the relationships between them have been thoroughly established using our assessment expertise. All versions of the paper give assessment of equal standard.

The content assessed by the examination papers and the type of questions is unchanged.

This change means that for this component there are now two variant Question Papers, Mark Schemes and Principal Examiner's Reports where previously there was only one. For any individual country, it is intended that only one variant is used. This document contains both variants which will give all Centres access to even more past examination material than is usually the case.

The diagram shows the relationship between the Question Papers, Mark Schemes and Principal Examiners' Reports that are available.

| **Question Paper** | **Mark Scheme** | **Principal Examiner's Report** |
|---|---|---|
| Introduction | Introduction | Introduction |
| First variant Question Paper | First variant Mark Scheme | First variant Principal Examiner's Report |
| Second variant Question Paper | Second variant Mark Scheme | Second variant Principal Examiner's Report |

**Who can I contact for further information on these changes?**
Please direct any questions about this to CIE's Customer Services team at:
international@cie.org.uk

The titles for the variant items should correspond with the table above, so that at the top of the first page of the relevant part of the document and on the header, it has the words:

- First variant Question Paper / Mark Scheme / Principal Examiner's Report

or

- Second variant Question Paper / Mark Scheme / Principal Examiner's Report

as appropriate.

First Variant Question Paper

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

*7692322713*

**BIOLOGY** **0610/31**

Paper 3 Extended **October/November 2008**

**1 hour 15 minutes**

Candidates answer on the Question Paper.

No Additional Materials are required.

**READ THESE INSTRUCTIONS FIRST**

Write your Centre number, candidate number and name on all the work you hand in.
Write in dark blue or black pen.
You may use a pencil for any diagrams or graphs.
Do not use staples, paper clips, highlighters, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.
At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.

| For Examiner's Use | |
|---|---|
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | |
| Total | |

This document consists of **13** printed pages and **3** blank pages.




UNIVERSITY of CAMBRIDGE International Examinations

For Examiner's Use

**1** The freshwater mussel, *Margaritifera margaritifera*, is a mollusc which lives in rivers and streams.

When the mussel reproduces, gametes are released into the water and fertilisation takes place.

The embryos, in the form of larvae, attach themselves to the gills of fish and develop there for a few months.

The larvae then release themselves and grow in sand in the river, feeding by filtering food from the water.

The number of mussels is falling due to human predation and the species is threatened with extinction.

**(a)** The mussel belongs to the group known as the molluscs. State two features you would expect the mussel to have.

1. .....

2. ..... [2]

**(b)** Explain how the species name of the freshwater mussel can be distinguished from its genus.

.....

..... [1]

**(c)** State the type of reproduction shown by the mussel.

Explain your answer.

type of reproduction .....

explanation .....

..... [2]

**(d)** **(i)** Fish gills have the same function as lungs. Suggest **one** advantage to a mussel larva of attaching itself to fish gills.

.....

..... [1]

**(ii)** The mussel develops on the fish gills. Define the term *development*.

.....

..... [1]

**(e)** The mussel is threatened with extinction. Name another organism which is also threatened with extinction and outline how it could be conserved.

*For Examiner's Use*

name of species .....

outline of conservation .....

.....

..... [3]

[Total: 10]

**2** Fig. 2.1 shows crop productivity for a range of plants but the bar graph is incomplete.

*For Examiner's Use*

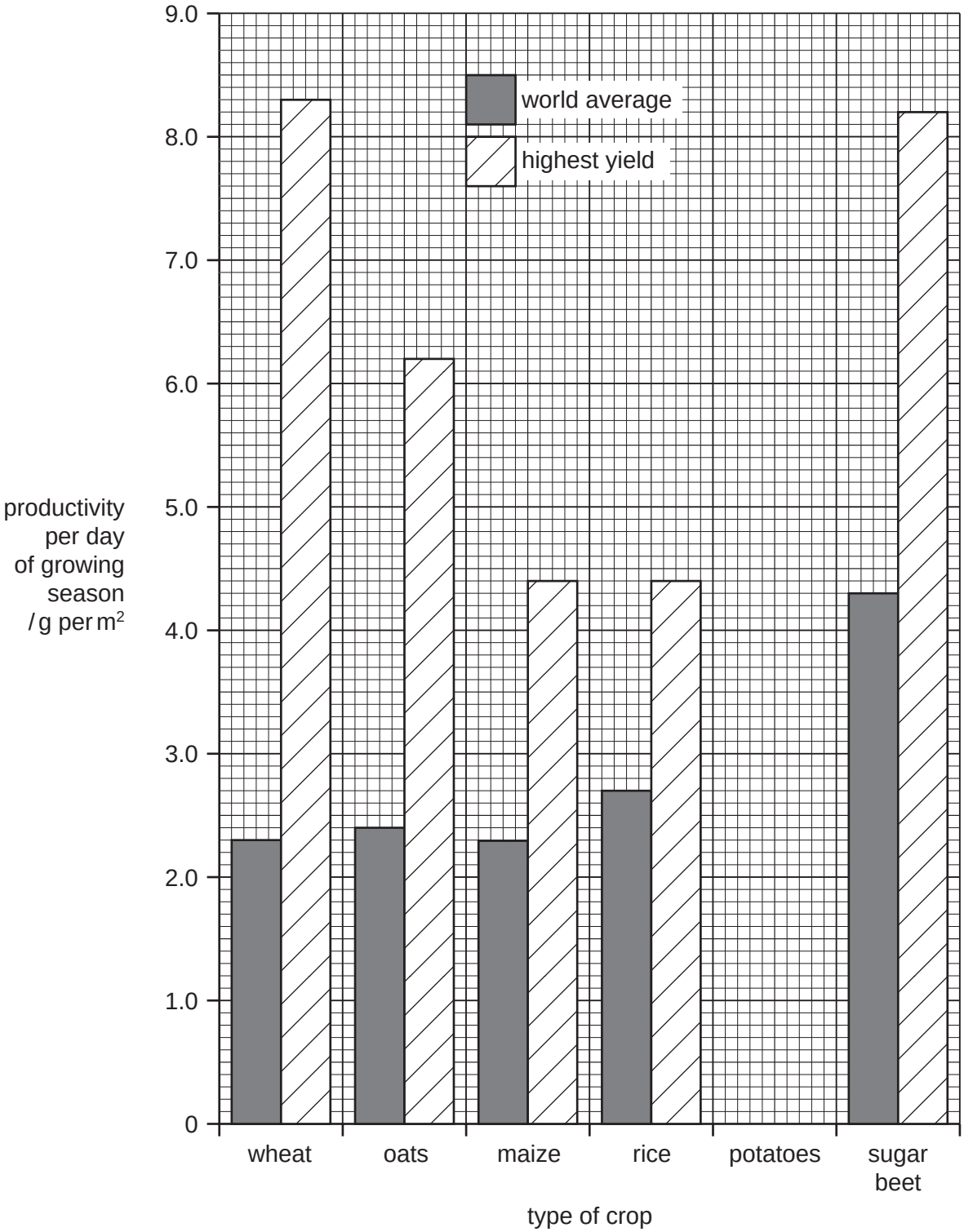


**Fig. 2.1**

*For Examiner's Use*

**(a)** Complete Fig. 2.1 using the following data.

| crop | productivity per day of growing season / g per $m^2$ | |
|---|---|---|
| | world average | highest yield |
| potatoes | 2.6 | 5.6 |

[2]

**(b)** State which crop has

**(i)** the highest average productivity,

.....

**(ii)** the greatest difference between the average yield and the highest yield.

..... [2]

**(c)** Outline how modern technology could be used to increase the productivity of a crop from the average yield to a high yield.

.....

.....

.....

..... [3]

**(d)** When the yield is measured, dry mass is always used rather than fresh mass.

Suggest why dry mass is a more reliable measurement than fresh mass.

.....

..... [1]

**(e)** Maize is often used to feed cows, which are grown to provide meat for humans.

Explain why it is more efficient for humans to eat maize rather than meat from cows that have been fed on maize.

.....

.....

..... [3]

**(f)** **(i)** Complete the equation for photosynthesis.

$$6CO_2 + 6H_2O \xrightarrow{\text{light energy}} C_6H_{12}O_6 + .....$$

[1]

**(ii)** Describe how leaves are adapted to trap light.

.....

.....

..... [2]

**(iii)** With reference to water potential, explain how water is absorbed by roots.

.....

.....

.....

..... [3]

**(iv)** Explain how photosynthesising cells obtain carbon dioxide.

.....

.....

..... [2]

[Total: 19]

**3** Mycoprotein is similar to single cell protein and is sold as an alternative to meat such as beef.

Table 3.1 shows the composition of mycoprotein and beef.

**Table 3.1**

| nutrient | dry mass / g per 100 g | |
|---|---|---|
| | mycoprotein | uncooked beef |
| protein | 49.0 | 51.4 |
| fat | 9.2 | 48.6 |
| fibre (roughage) | 19.5 | 0.0 |
| carbohydrate | 20.6 | 0.0 |

**(a) (i)** State two differences in composition between mycoprotein and beef.

1. .....

2. ..... [2]

**(ii)** Using data from Table 3.1, suggest two reasons why eating mycoprotein is better for health than eating beef.

Explain your answers.

reason 1 .....

explanation .....

.....

reason 2 .....

explanation .....

..... [4]





[Turn over

For Examiner's Use

**(b) (i)** Calculate the dry mass of mycoprotein **not** represented by protein, fat, fibre or carbohydrate.

Show your working.

Answer .....g [2]

**(ii)** Suggest **one** nutrient that this dry mass might contain.

..... [1]

**(c)** The antibiotic penicillin is produced by fungi that are grown in a fermenter, as shown in Fig. 3.1. The process is similar to the manufacture of enzymes.

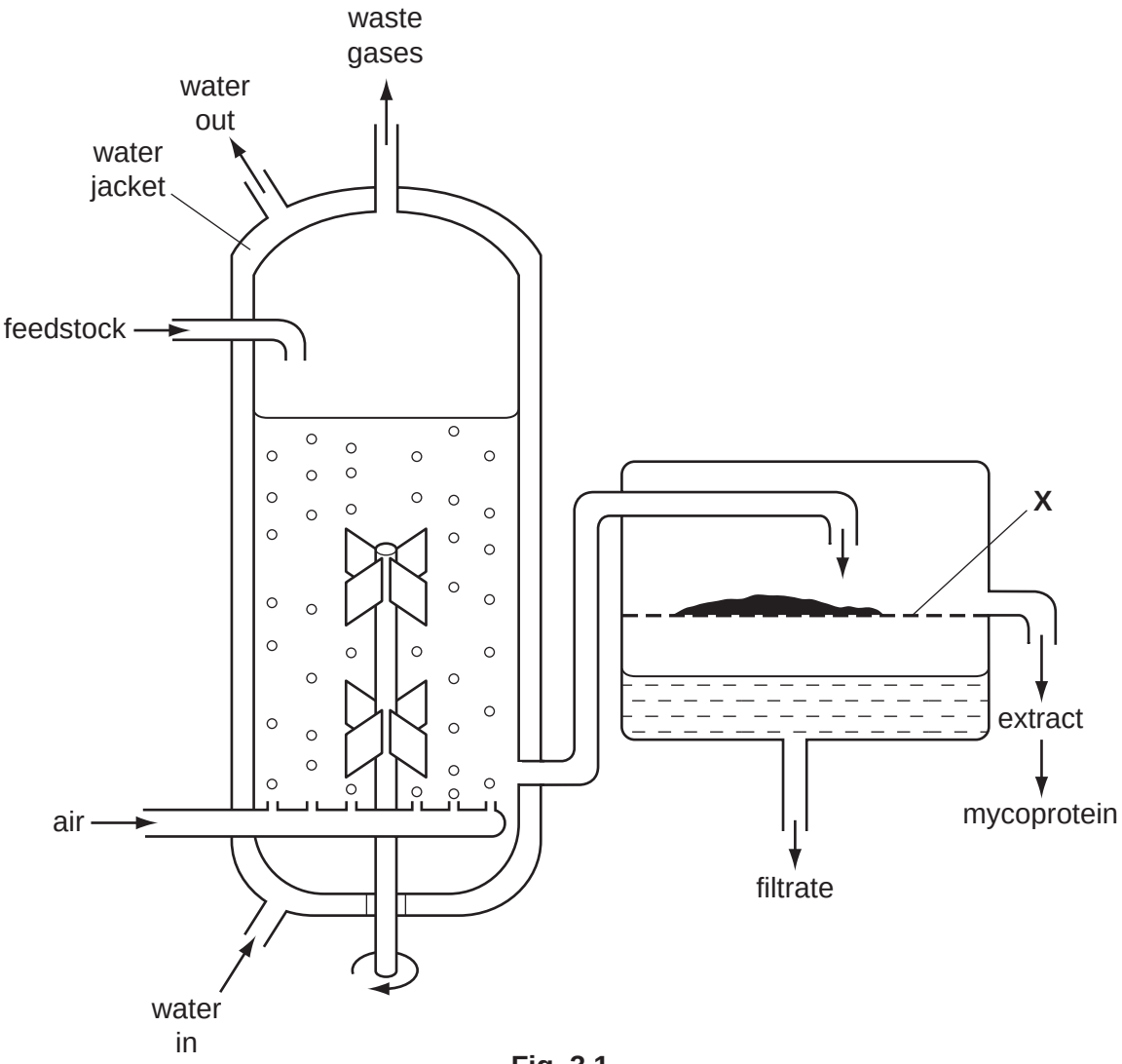


**Fig. 3.1**

**(i)** Name the two raw materials likely to be present in the feedstock.

1. .....

2. ..... [2]

**(ii)** State the function of **X.**

..... [1]

**(iii)** Suggest the name of the main gas present in the waste gases.

..... [1]

**(d)** During the fermenting process, the temperature in the container would rise unless steps are taken to maintain a constant temperature.

**(i)** Suggest a suitable temperature for the feedstock.

..... [1]

**(ii)** Explain why the temperature rises.

.....

..... [2]

**(iii)** Explain why a constant temperature has to be maintained.

.....

.....

..... [2]

**(iv)** Using the information from Fig. 3.1, suggest **how** a constant temperature is maintained.

.....

..... [1]

[Total: 19]

*For Examiner's Use*

**4** A newspaper headline incorrectly stated, "The use of condoms can result in erectile dysfunction".

Erectile dysfunction is a medical problem which results in problems with sexual intercourse.

Scientists are concerned that this incorrect statement could lead to an increase in HIV.

**(a)** Describe the process of sexual intercourse in humans.

.....

.....

..... [2]

**(b)** Condoms are used as one form of birth control.

**(i)** What name is used to describe this method of birth control?

..... [1]

**(ii)** Explain how a condom acts as a method of birth control.

.....

.....

..... [2]

**(c)** Some readers of the newspaper may believe the newspaper and stop using condoms during sexual intercourse.

**(i)** Explain how a decrease in the use of condoms may lead to an increase in the incidence of HIV.

.....

.....

..... [2]

**(ii)** State two ways by which a person who does not have sexual intercourse might still become infected with HIV.

1. .....

2. ..... [2]

*For Examiner's Use*

**(iii)** Explain why the immune system is less effective in a person with HIV.

.....

.....

.....

.....

..... [3]

**(d)** Another sexually transmitted disease is gonorrhoea.

For this disease, state

**(i)** one sign or symptom,

.....

**(ii)** one effect on the body,

.....

**(iii)** the treatment.

.....

..... [3]

[Total: 15]

**5** Table 5.1 shows the energy reserves for skeletal muscles in an athlete.

**Table 5.1**

| energy reserve | mass / g | energy / kJ | time the reserve would last / min | |
|---|---|---|---|---|
| | | | walking | marathon running |
| blood glucose | 3 | 48 | 4 | 1 |
| liver glycogen | 100 | 1660 | 86 | 20 |
| muscle glycogen | 350 | 5800 | 288 | 71 |
| fat in skin | 9000 | 337 500 | 15 500 | 4018 |

**(a) (i)** Compare the effect of walking and marathon running on energy reserves.

.....

..... [2]

**(ii)** Suggest which two energy reserves would be most readily available to muscles during exercise.

1. .....

2. ..... [1]

**(iii)** Underline the **two** food groups to which the energy reserves in Table 5.1 belong.

protein mineral fibre fat carbohydrate [1]

**(iv)** Calculate the energy per gram of glycogen.

Show your working.

energy = ..... kJ [2]

**(b)** Suggest why athletes eat foods high in

**(i)** proteins, during training;

.....

..... [1]

**(ii)** carbohydrates, for three days before a marathon race.

.....

.....

..... [2]

**(c)** During a fast race (a 100 metre sprint), 95% of the energy comes from anaerobic respiration.

During a marathon, only 2% of the energy comes from anaerobic respiration.

**(i)** State the equation, in symbols, for anaerobic respiration in muscles.

..... [2]

**(ii)** Suggest and explain why a sprinter can use mainly anaerobic respiration during the race, while a marathon runner needs to use aerobic respiration.

.....

.....

.....

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..... [4]

**(iii)** Explain how, during a marathon race, the blood glucose concentration stays fairly constant, but the mass of glycogen in the liver decreases.

.....

.....

..... [2]

[Total: 17]

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Second Variant Question Paper

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

*3942584201*

**BIOLOGY** **0610/32**

Paper 3 Extended **October/November 2008**

**1 hour 15 minutes**

Candidates answer on the Question Paper.

No Additional Materials are required.

**READ THESE INSTRUCTIONS FIRST**

Write your Centre number, candidate number and name on all the work you hand in.
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Answer **all** questions.
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| For Examiner's Use | |
|---|---|
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | |
| Total | |

This document consists of **15** printed pages and **1** blank page.

For Examiner's Use

**1** The freshwater mussel, *Margaritifera margaritifera*, is a mollusc which lives in rivers and streams.

When the mussel reproduces, gametes are released into the water and fertilisation takes place.

The embryos, in the form of larvae, attach themselves to the gills of fish and develop there for a few months.

The larvae then release themselves and grow in sand in the river, feeding by filtering food from the water.

The number of mussels is falling due to human predation and the species is threatened with extinction.

**(a)** The mussel belongs to the group known as the molluscs. State two features you would expect the mussel to have.

1. .....

2. ..... [2]

**(b)** Explain how the species name of the freshwater mussel can be distinguished from its genus.

.....

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**(c)** State the type of reproduction shown by the mussel.

Explain your answer.

type of reproduction .....

explanation .....

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**(d)** **(i)** Fish gills have the same function as lungs. Suggest **one** advantage to a mussel larva of attaching itself to fish gills.

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**(ii)** The mussel develops on the fish gills. Define the term *development*.

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**(e)** The mussel is threatened with extinction. Name another organism which is also threatened with extinction and outline how it could be conserved.

*For Examiner's Use*

name of species .....

outline of conservation .....

.....

..... [3]

[Total: 10]

**2** Fig. 2.1 shows the apparatus used to find the energy in a groundnut.

Results of the experiment are shown in Table 2.1.

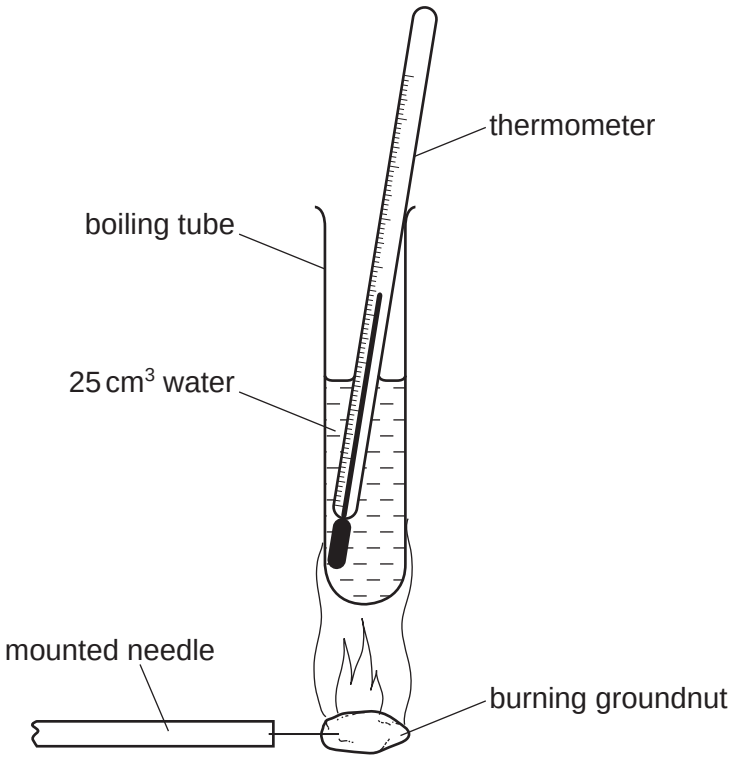


**Fig. 2.1**

**Table 2.1**

| mass of nut / g | increase in temperature / °C | energy / J |
|---|---|---|
| 0.3 | 15 | 1575 |
| 0.4 | 24 | |
| 0.5 | 29 | 3045 |
| 0.6 | 34 | 3570 |
| 0.7 | 44 | 4620 |

*For Examiner's Use*

**(a)** Describe how the apparatus could be used to obtain the data shown in Table 2.1.

.....

.....

.....

.....

.....

.....

..... [5]

**(b)** The energy released by a groundnut was calculated using the equation shown below.

energy = volume of water × increase in temperature × 4.2

Calculate the energy released by a groundnut of mass 0.4 g.

Show your working.

energy = ..... J [2]

For Examiner's Use

**(c)** Fig. 2.2 shows a graph of the relationship between mass of groundnut and the energy it contains. The graph is incomplete.

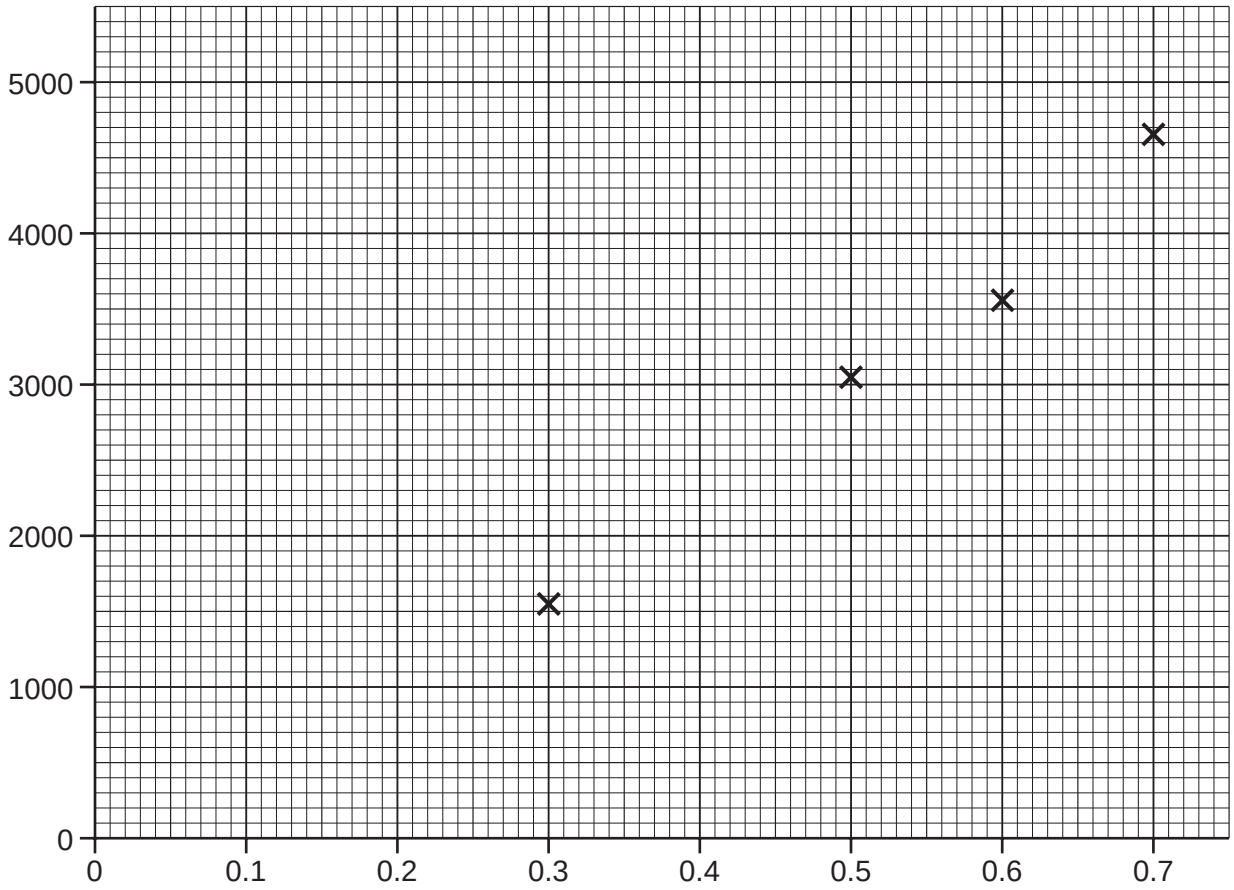


**Fig. 2.2**

**(i)** Complete the graph, by adding the missing energy value, calculated in **(b)**, drawing a line through the points and labelling the axes. [3]

**(ii)** Describe the trend shown by the graph.

.....

..... [1]

For Examiner's Use

**(d) (i)** The experimental results show that a groundnut of mass 0.5 g contains 3045 J energy.

Calculate the energy released from 100 g of these groundnuts.

energy in 100 g = ..... J [1]

**(ii)** Official figures state that 100 g of groundnuts contain 2 428 000 J energy.

With reference to the apparatus in Fig. 2.1, suggest two reasons why the experimental energy value for 100 g of groundnuts is much lower than the official energy value.

1. .....

.....

2. .....

..... [2]

**(e)** Groundnuts plants are legumes.

Describe how a groundnut plant obtains the nitrogen-containing compounds that it needs to make proteins.

.....

.....

.....

.....

.....

.....

..... [5]

[Total:19]

*For Examiner's Use*

**3** Mycoprotein is similar to single cell protein and is sold as an alternative to meat such as beef.

Table 3.1 shows the composition of mycoprotein and beef.

**Table 3.1**

| nutrient | dry mass / g per 100 g | |
|---|---|---|
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2. ..... [2]

**(ii)** Using data from Table 3.1, suggest two reasons why eating mycoprotein is better for health than eating beef.

Explain your answers.

reason 1 .....

explanation .....

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reason 2 .....

explanation .....

..... [4]

**(b) (i)** Calculate the dry mass of mycoprotein **not** represented by protein, fat, fibre or carbohydrate.

Show your working.

*For Examiner's Use*

Answer .....g [2]

**(ii)** Suggest **one** nutrient that this dry mass might contain.

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For Examiner's Use

**(c)** The antibiotic penicillin is produced by fungi that are grown in a fermenter, as shown in Fig. 3.1.
The process is similar to the manufacture of enzymes.

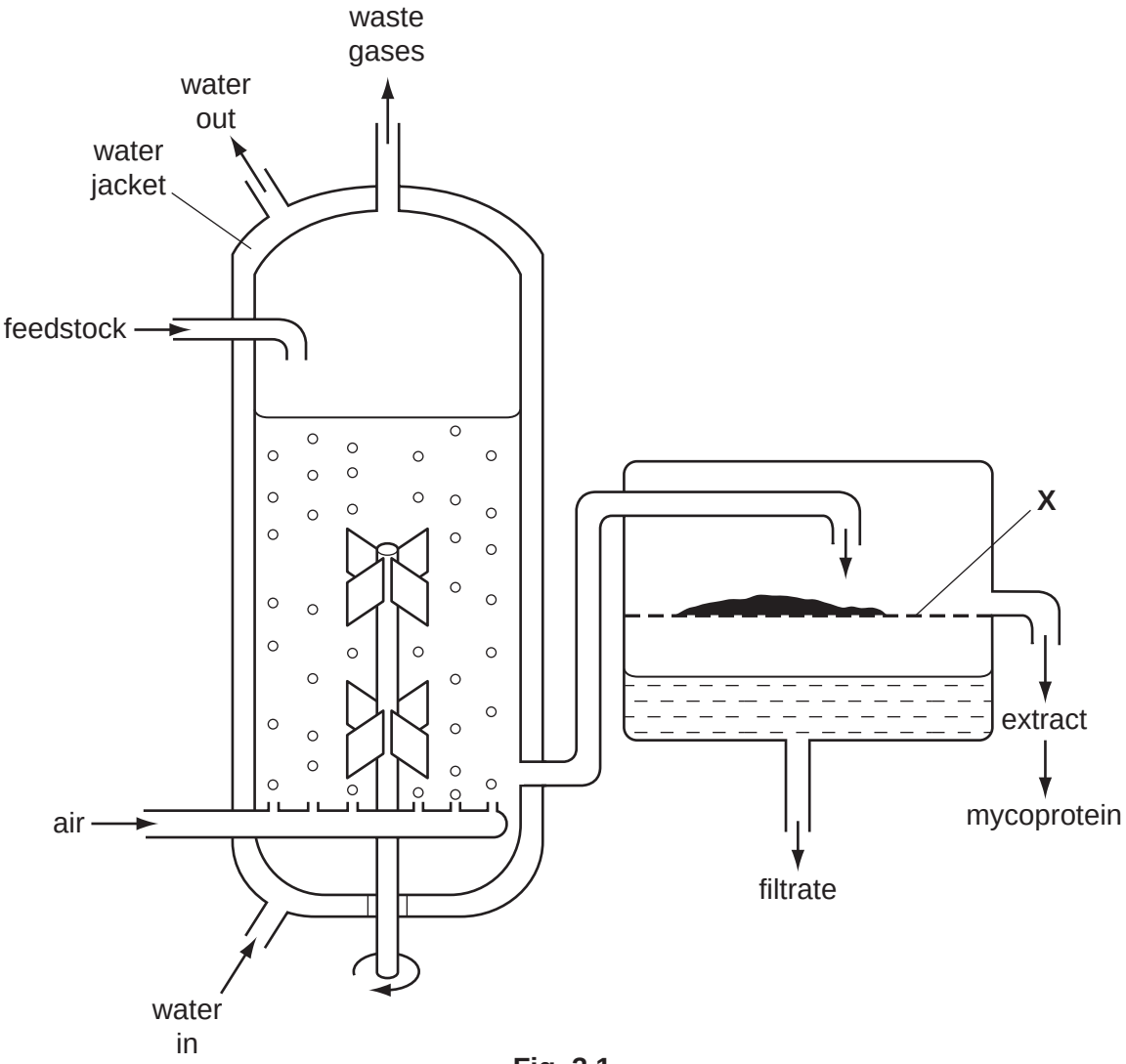


**Fig. 3.1**

**(i)** Name the two raw materials likely to be present in the feedstock.

1. .....

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**(ii)** State the function of **X**.

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**(iii)** Suggest the name of the main gas present in the waste gases.

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**(d)** During the fermenting process, the temperature in the container would rise unless steps are taken to maintain a constant temperature.

**(i)** Suggest a suitable temperature for the feedstock.

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**(iv)** Using information from Fig. 3.1, suggest **how** a constant temperature is maintained.

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[Total: 19]

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Erectile dysfunction is a medical problem which results in problems with sexual intercourse.

Scientists are concerned that this incorrect statement could lead to an increase in HIV.

**(a)** Describe the process of sexual intercourse in humans.

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**(b)** Condoms are used as one form of birth control.

**(i)** What name is used to describe this method of birth control?

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**(c)** Some readers of the newspaper may believe the newspaper and stop using condoms during sexual intercourse.

**(i)** Explain how a decrease in the use of condoms may lead to an increase in the incidence of HIV.

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**(ii)** State two ways by which a person who does not have sexual intercourse might still become infected with HIV.

1. .....

2. ..... [2]

*For Examiner's Use*

**(iii)** Explain why the immune system is less effective in a person with HIV.

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..... [3]

**(d)** Another sexually transmitted disease is gonorrhoea.

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**(ii)** Suggest which two energy reserves would be most readily available to muscles during exercise.

1. .....

2. ..... [1]

**(iii)** Underline the **two** food groups to which the energy reserves in Table 5.1 belong.

protein mineral fibre fat carbohydrate [1]

**(iv)** Calculate the energy per gram of glycogen.

Show your working.

energy = ..... kJ per gram [2]

**(b)** Suggest why athletes eat foods high in

**(i)** proteins, during their training;

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..... [1]

**(ii)** carbohydrates, for three days before a marathon race.

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**(c)** During a fast race (a 100 metre sprint), 95% of the energy comes from anaerobic respiration.

During a marathon, only 2% of the energy comes from anaerobic respiration.

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**(ii)** Suggest and explain why a sprinter can use mainly anaerobic respiration during the race, while a marathon runner needs to use aerobic respiration.

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**(iii)** Explain how, during a marathon race, the blood glucose concentration stays fairly constant, but the mass of glycogen in the liver decreases.

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[Total: 17]

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