

**GENERAL CERTIFICATE OF SECONDARY EDUCATION
APPLIED SCIENCE: DOUBLE AWARD**

**J649
B482/01**

Unit 2: Science for the needs of society (Foundation Tier)

TUESDAY 17 JUNE 2008

Morning
Time: 1 hour

Candidates answer on the question paper
Additional materials (enclosed): None

Additional materials (required):
Calculators may be used
Pencil
Ruler (cm/mm)



Candidate
Forename

Candidate
Surname

Centre
Number

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Candidate
Number

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INSTRUCTIONS TO CANDIDATES

- Write your name in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use blue or black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure that you know what you have to do before starting your answer.
- Answer **all** the questions.
- Do **not** write in the bar codes.
- Write your answer to each question in the space provided.

INFORMATION FOR CANDIDATES

- The number of marks for each question is given in brackets [] at the end of each question or part question.
- The total number of marks for this paper is **60**.
- The marks allocated and the spaces provided for your answers are a good indication of the length of answers required.

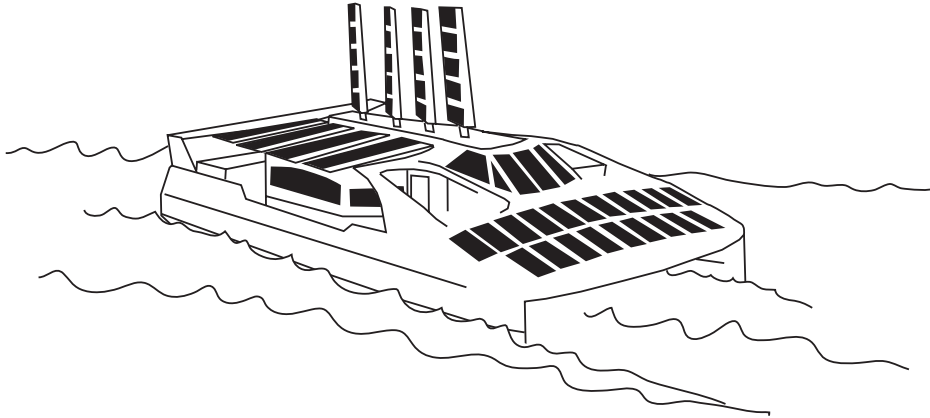
FOR EXAMINER'S USE

Qu.	Max.	Mark
1	11	
2	12	
3	10	
4	9	
5	9	
6	9	
TOTAL	60	

This document consists of **16** printed pages.

Answer **all** the questions.

- 1 A new type of passenger ferry will start to take passengers from San Francisco to Alcatraz in 2008.



Many ferries use diesel fuel from crude oil to power their engines.

The new ferry has solar panels on its roof that can be lifted up to make sails.

It will have a back up diesel engine. This small engine will be used when the solar panels do not generate enough energy.

- (a) (i) Put a **ring** around the **three** types of energy sources that the **new ferry** uses.

biomass **diesel oil** **sunlight** **tidal** **wind**

[2]

- (ii) Which one of the energy sources is non-renewable?

Put a **ring** around the correct answer.

biomass **diesel oil** **sunlight** **tidal** **wind**

[1]

- (b) The ferry needs a diesel engine as back up.

Explain why the solar panels and sails may not always be able to collect energy.

The **solar panels** may not always collect energy because

.....

The **sails** may not always collect energy because

..... [2]

- (c) Give **one** advantage of using solar panels rather than a diesel engine to run the ferry.

..... [1]

- (d) One disadvantage of using solar panels is that the ferry has to carry a large number of batteries.

The batteries are charged up from energy collected by the solar panels.

The energy from the batteries is used to make the propeller turn.

This pushes the ferry forward through the water.

Complete the sentences in the boxes to show the energy transfers that happen in the ferry.

Choose from these words.

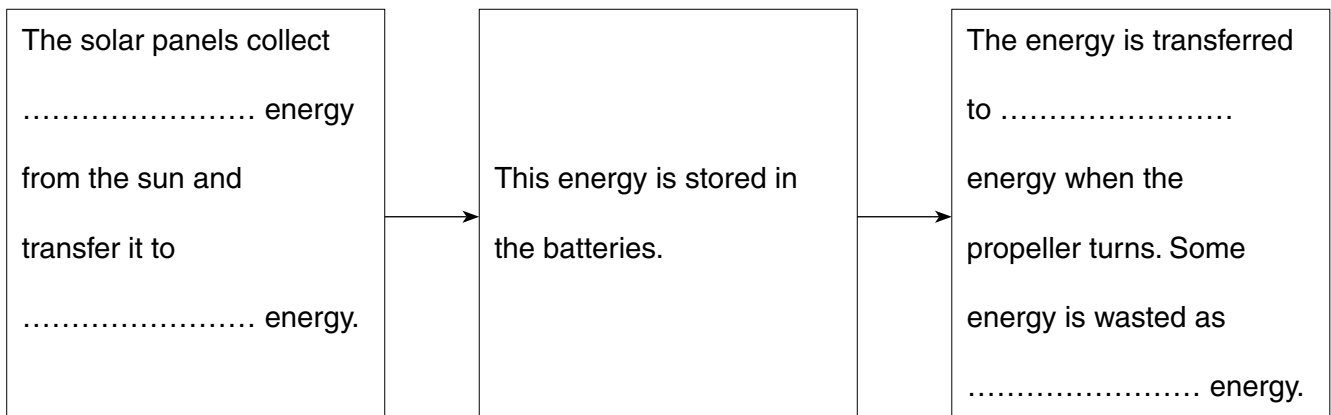
electrical

heat

light

movement

nuclear



[4]

- (e) The ferry has a satellite navigation system which uses the same type of wave as a mobile phone.

What type of wave is used?

Put a tick (✓) in the correct box.

infra-red

X-ray

microwave

visible

[1]

[Total: 11]

2 Read the newspaper story about juniper bushes.

NO MORE JUNIPER, NO MORE GIN!

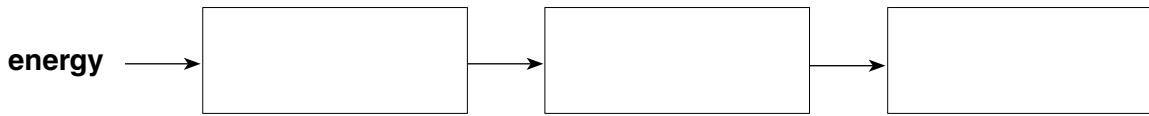
Sussex was once rich in juniper bushes but they are now dying out. Rabbits seem to be the main culprits. There is plenty of grass for them, but they like to eat young juniper bushes and kill older bushes by stripping off the bark. Usually the junipers grow fastest in the summer, but this is when the rabbits feed the most, so they are not showing much growth even in summer.



A scientist who has been studying the problem says, ‘One of the main predators of rabbits is the owl, but owls are dying out because they cannot find suitable nesting sites. This has affected the population of the rabbits and has caused more damage to junipers’.

Juniper berry juice is used to give gin its flavour. Losing our native juniper bushes could mean the end of gin making in this country.

(a) Use the information in the article to draw a food chain that involves rabbits.



[2]

(b) If the juniper bushes die out, the population of rabbits will not be affected.

Explain why.

.....
..... [1]

(c) The scientist in the newspaper story says that the decrease in the number of owls has affected the population of rabbits.

Explain how the population of rabbits is affected when there are fewer owls.

.....
..... [2]

(d) The article says that the juniper bushes usually grow fastest during the summer.

Complete the passage to explain why this happens.

Choose words from this list.

- glucose heat light carbon dioxide**
photosynthesis respiration

During the summer, the sun provides more and
..... for the plant leaves.

This increases the rate of

The plant can then make more to use as food. [3]

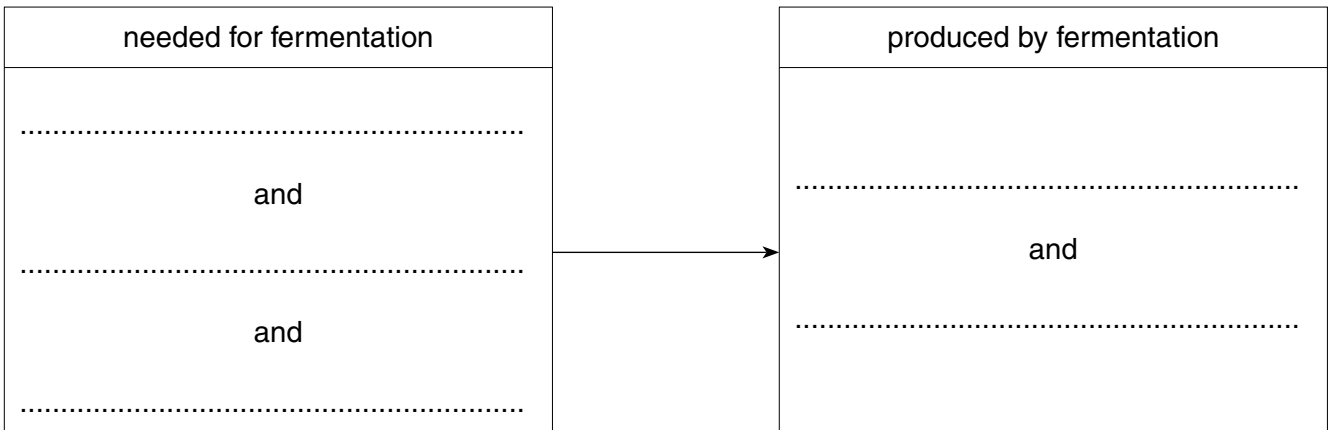
(e) Juniper berries are used to flavour gin.

The first step to make gin involves fermentation.

(i) Fill in the boxes to show what is needed for fermentation and what is produced.

Use these words.

- alcohol carbon dioxide sugar water yeast**



[3]

6

(ii) Juice from the juniper berries is added to gin.

The juice dissolves in the gin and gives it a flavour.

What is formed when the juice dissolves in the gin?

Put a tick (✓) in the correct box.

a solution

a suspension

an enzyme

a precipitate

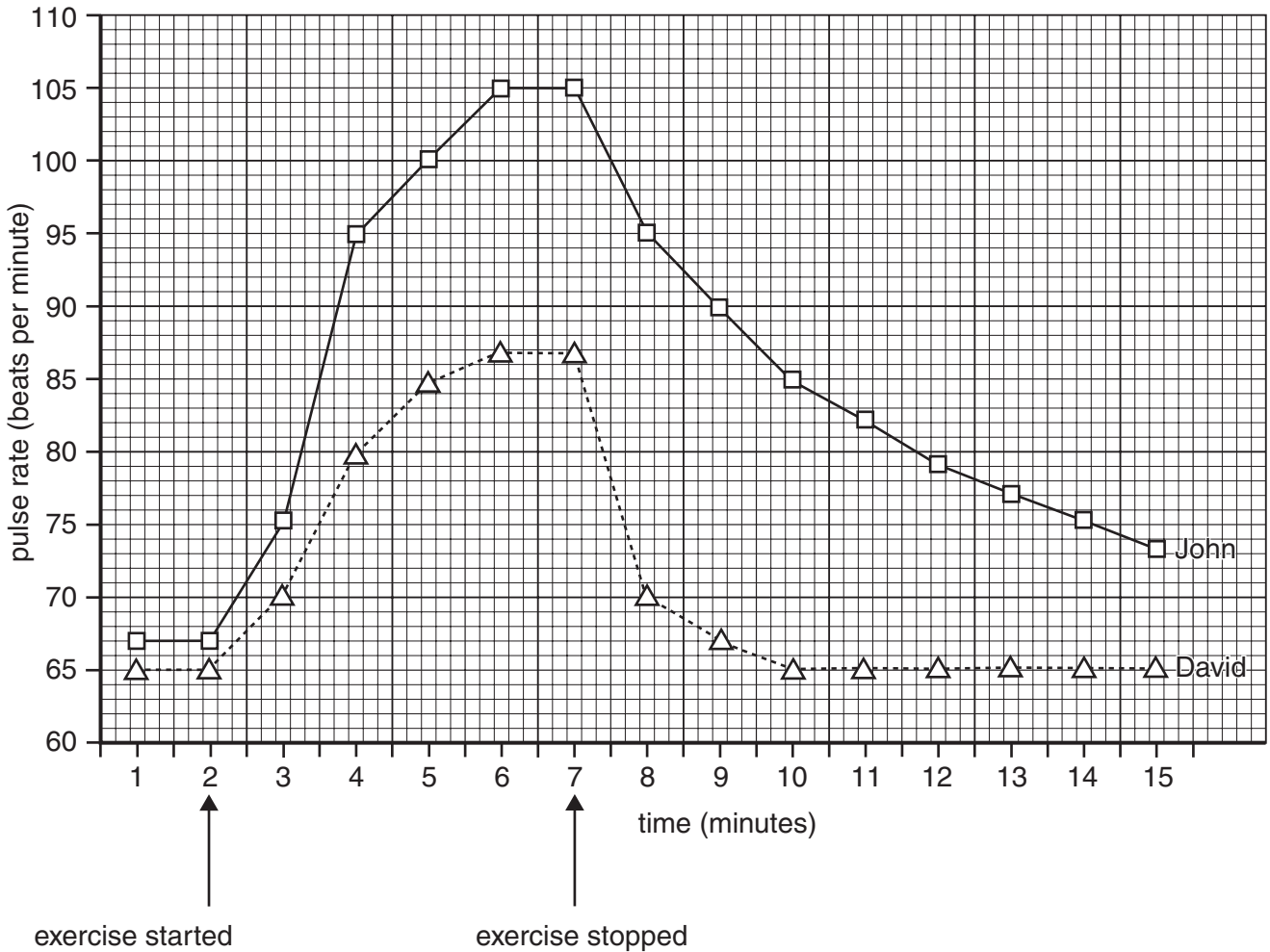
[1]

[Total: 12]

3 Eve is a fitness instructor in a gym.

She tests the fitness levels of two new members, David and John.

She measures their pulse rates before, during and after exercising.



(a) (i) What is the resting pulse rate of David and John?

David beats per minute.

John beats per minute.

[2]

(ii) How long does it take David's pulse to return to normal after exercise?

..... minutes [1]

(b) Eve tells John about the results of the pulse rate test.

She says, 'Your pulse rate during exercise is very high.

You need to take more exercise to help your heart and lungs'.

She shows John a diagram of the structure of the inside of his chest.

Label the diagram.

Use these words.

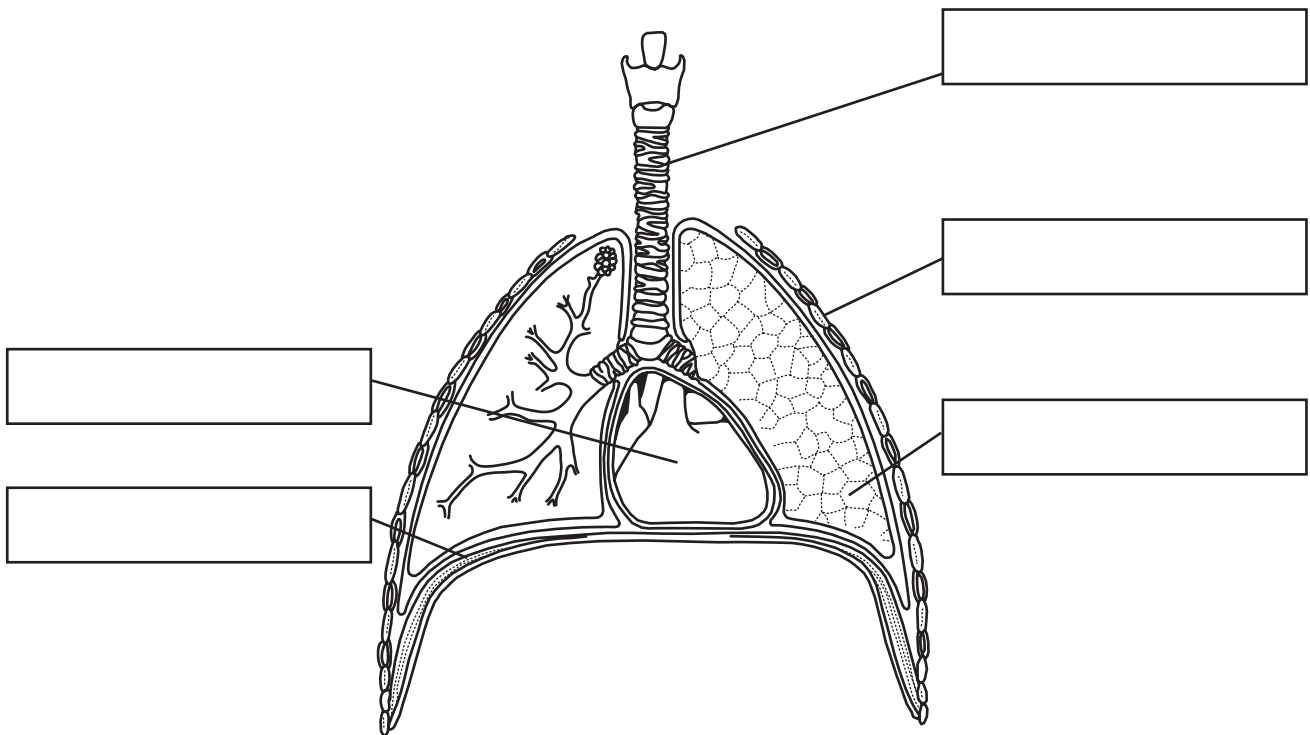
diaphragm

heart

lung

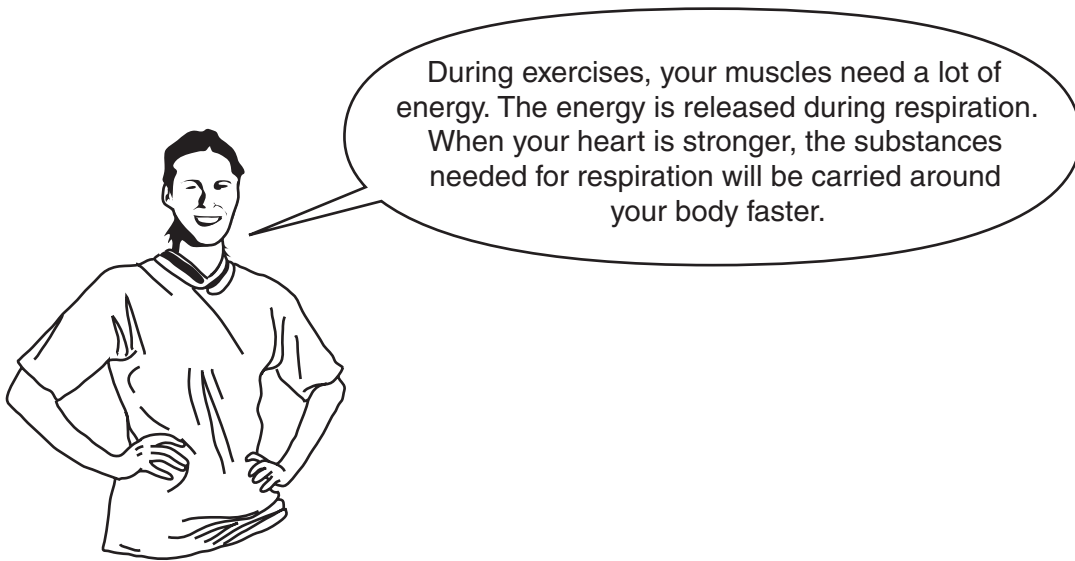
rib

trachea



[3]

(c) Eve tells John that when his heart is stronger, he will find exercising easier.



(i) What substances are needed for respiration?

Put ticks (✓) in **two** correct boxes.

- carbon dioxide
- glucose
- nitrogen
- oxygen
- water

[2]

(ii) Explain why a stronger heart will improve blood circulation.

.....
..... [1]

(d) Eve also notices that John gets very hot when he exercises.

What is normal body temperature?

Put a **ring** around the correct answer.

- 15 °C 20 °C 37 °C 72 °C 100 °C

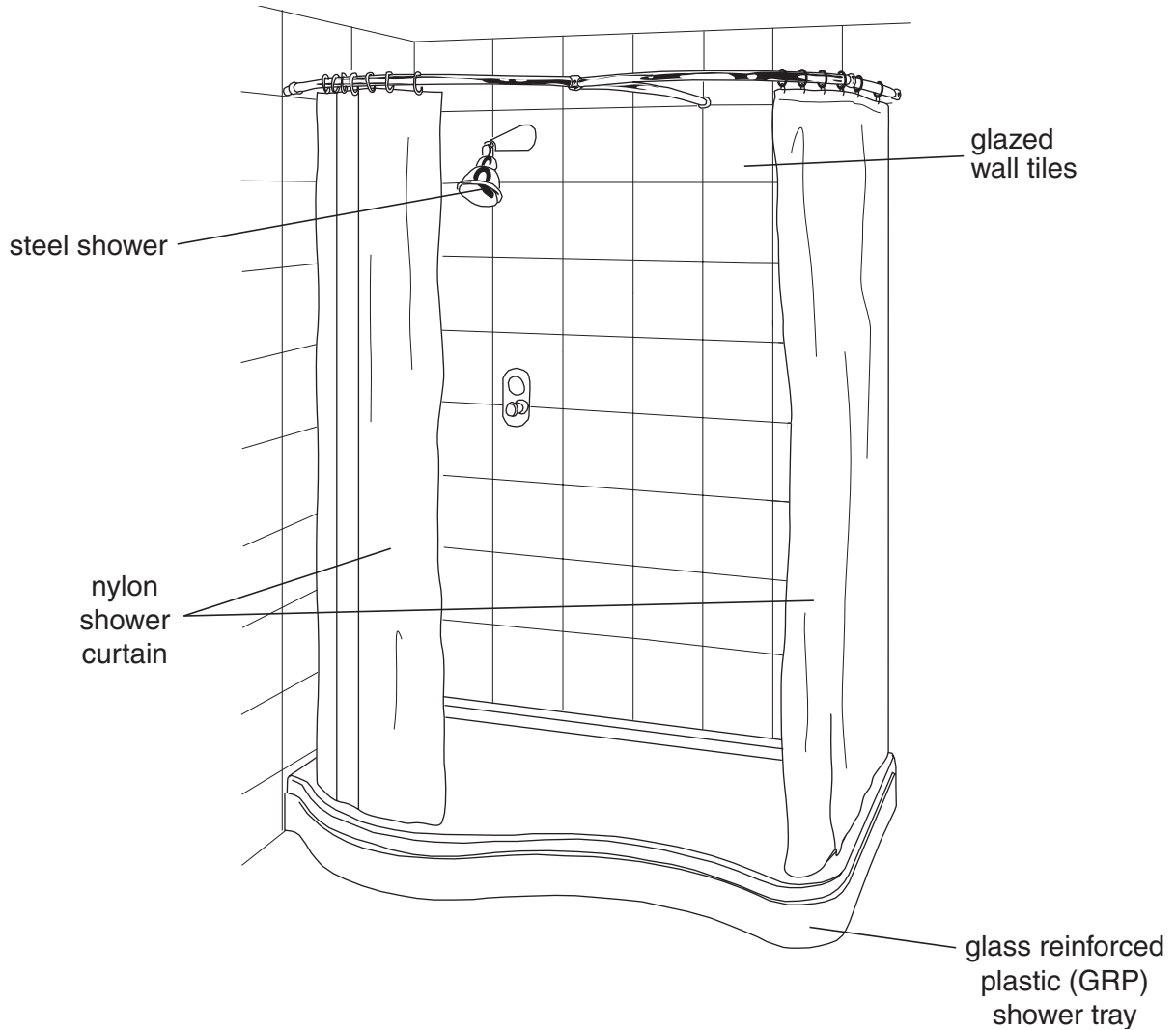
[1]

[Total: 10]

4 Joe works as a bathroom and kitchen fitter.

(a) He installs a new shower in a house.

This diagram shows the materials he uses.



Draw straight lines to connect each **shower part** with the correct **type of material**.

shower part	type of material
steel shower	ceramic
glazed wall tiles	composite
glass reinforced plastic (GRP) shower tray	polymer
nylon shower curtains	metal

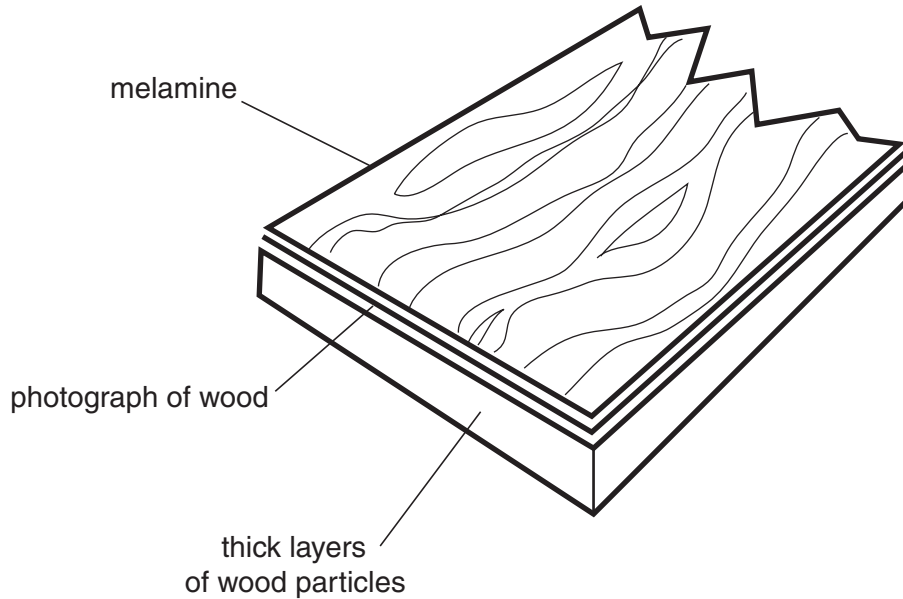
[3]

- (b) Rose is the owner of the house. She is deciding whether to have a solid wood or a laminate floor in the kitchen.

Joe explains what a laminate floor is made from.

Laminate flooring may be better than wood for your kitchen because it is a composite material. It is made from layers of different materials.

The top surface is a layer of a polymer called melamine. It looks like wood because there is a photograph of wood under the melamine.



- (i) Joe says that the laminate flooring will be better than wood for using in a kitchen.

Why are composite materials sometimes better than natural materials?

.....
..... [1]

- (ii) Rose is not sure about having laminate flooring.

She is confused about some of the materials that are used to make laminate flooring.

Read the statements that Rose makes and decide if they are true or false.

Put ticks (✓) in the correct boxes.

Rose's statement	True	False
Laminate flooring uses wood. Wood is a non-renewable resource.	<input type="checkbox"/>	<input type="checkbox"/>
I know that melamine is a plastic polymer and so it will have exactly the same properties as poly(ethene).	<input type="checkbox"/>	<input type="checkbox"/>
Melamine is a polymer. Crude oil is used up when it is made.	<input type="checkbox"/>	<input type="checkbox"/>
The floor might get damaged if I drop something hot because all polymers melt when they get hot.	<input type="checkbox"/>	<input type="checkbox"/>

[3]

- (iii) Joe tells Rose that scientists have been involved in developing laminate flooring.

Give **two** examples of ways that scientists are involved in developing new products.

1.

2. [2]

[Total: 9]

5 This news report is about a new gas pipeline that opened in 2006.

The Daily News October 2006

GAS PIPELINE TO CUT FUEL PRICES

This week, the world's longest gas pipeline started to carry methane gas from Norway to Easington on the east coast of the UK. The pipeline will carry 20% of all the gas supplies needed in the UK. The extra supply is expected to make fuel gas prices cheaper.



(a) The pipeline carries methane gas.

Methane is an organic gas that is a very good fuel.

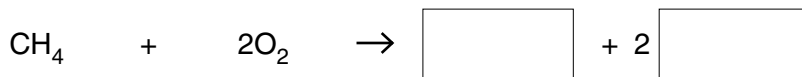
It gives out a lot of energy when it burns.

(i) Complete the symbol equation to show what happens when methane burns.

word equation

methane + oxygen → carbon dioxide + water

symbol equation

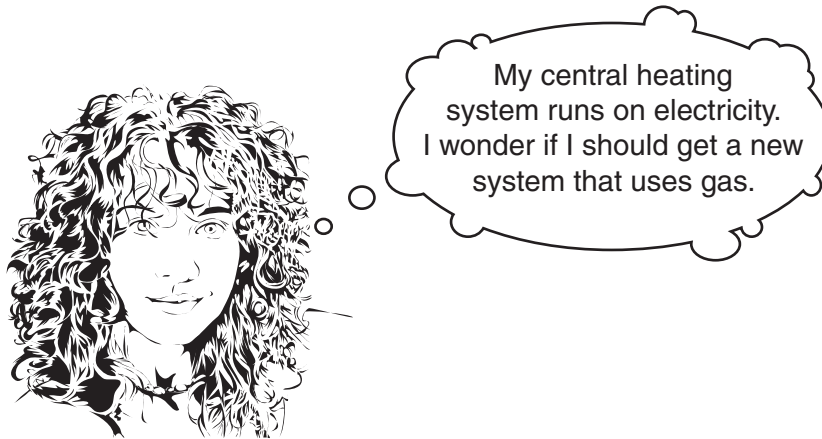


[1]

(ii) Explain why methane is called an **organic** gas.

.....
 [1]

- (b) Liz reads the news report. She wonders whether she should change her central heating system.



What other information does Liz need to think about before she decides to switch to gas?

.....
.....
..... [2]

- (c) The news report explains how the pipeline was made.

Building the pipeline used up 1/3 of the total iron produced in the world in 2005. Some of the iron ore used to produce the iron was quarried in Norway. Local people objected to the increased quarrying, but it went ahead anyway. Steel is an ideal material to use because the pipeline needs to last under the sea for about 50 years.

- (i) The article says that people objected to the increased quarrying of iron ore.

What problems does quarrying cause?

.....
.....
..... [3]

- (ii) Suggest **two** properties that would be important to think about when choosing the material to make the pipeline.

1.
2. [2]

[Total: 9]

6 Max works in a planetarium.

The planetarium projects images of the stars in the night sky onto the ceiling of a dome.



One of Max's jobs is to give a talk to the visitors.

(a) Max tells the visitors about the different types of telescopes used by astronomers.

(i) Two new types of telescope use X-rays and gamma rays.

Write down **two** differences between the wave properties of X-rays and gamma rays.

difference 1

difference 2 [2]

(ii) Name **two** other types of telescope.

1.

2. [2]

(b) Max also has to describe different objects in the sky.

Write a short speech Max could use to tell customers about **stars, galaxies and the solar system**.

You should explain what each object is.

.....

.....

.....

.....

..... [4]

(c) Max often finds people do not understand about light-years.

Which one of the following statements is correct?

Put a tick (✓) in the correct box.

light-years are a unit of time

light-years are a unit of brightness

light-years are a unit of distance

[1]

[Total: 9]

END OF QUESTION PAPER

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