

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

**J649
B482/01**

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

**Friday 12 June 2009
Morning**

Duration: 1 hour

Candidates answer on the question paper
A calculator may be used for this paper

OCR Supplied Materials:
None

Other Materials Required:

- Pencil
- Ruler (cm/mm)



Candidate Forename		Candidate Surname	
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Centre Number						Candidate Number				
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INSTRUCTIONS TO CANDIDATES

- Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use 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, however additional paper may be used if necessary.

INFORMATION FOR CANDIDATES

- The number of marks 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.
- This document consists of **16** pages. Any blank pages are indicated.

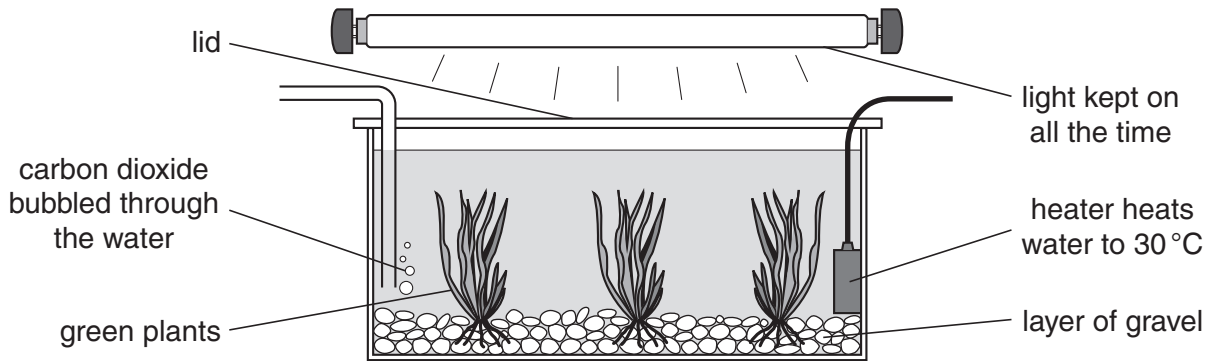
FOR EXAMINER'S USE		
Qu.	Max.	Mark
1	10	
2	10	
3	10	
4	10	
5	10	
6	10	
TOTAL	60	

Answer **all** the questions.

1 Liz works for a company that grows pond plants to sell to garden centres.

The plants grow in a tank of water.

The diagram shows how she sets up a tank.



(a) (i) Look at the diagram.

Write down the three **main** reasons why the plants grow well in this tank.

- 1
- 2
- 3 [3]

(ii) Which process do the plants carry out in the tank?

Put a ring around the correct answer.

- combustion** **digestion** **photosynthesis** **precipitation**

[1]

(iii) What do the plants **produce** when they carry out this process?

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

light

oxygen

nitrogen

glucose

fat

[2]

(b) Liz adds nutrients to the water.

The nutrients contain essential elements.

(i) Which essential elements do plants need?

Put **(rings)** around **two** correct answers.

bromine chlorine lithium nitrogen phosphorus

[2]

(ii) Why do plants need essential elements?

..... [1]

(c) The company also sells tropical fish.

Suggest a reason why Liz does not keep fish in the tanks used to grow the plants.

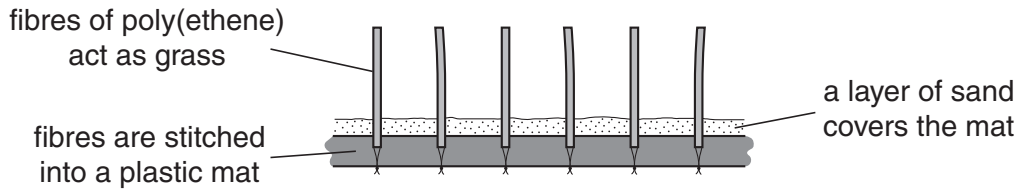
..... [1]

[Total: 10]

2 Some football pitches have artificial grass.

The pitch is made up of lots of fibres of poly(ethene) 'grass'.

The diagram shows a close up of the structure of the grass.



(a) (i) What type of material is poly(ethene)?

Put a ring around the correct answer.

- ceramic composite metal polymer

[1]

(ii) Which of the following statements about poly(ethene) are true and which are false?

Put ticks (✓) in the correct boxes.

	true	false
poly(ethene) does not rot away		
poly(ethene) is hard and brittle		
poly(ethene) is a natural material		
poly(ethene) is made from crude oil		

[3]

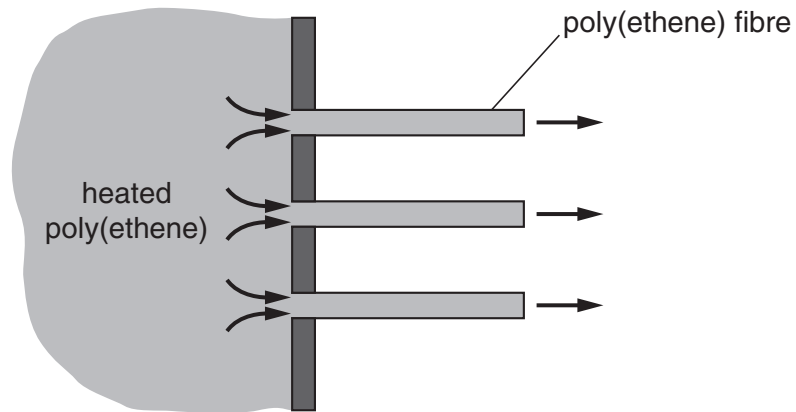
(iii) Suggest **two** reasons why a poly(ethene) pitch is better than a grass pitch.

.....

..... [2]

(b) The fibres are made by heating poly(ethene).

The heated poly(ethene) is shaped by being forced through small holes.



(i) What happens to poly(ethene) when it gets hot?

..... [1]

(ii) Suggest why all polymers cannot be shaped in this way.

..... [1]

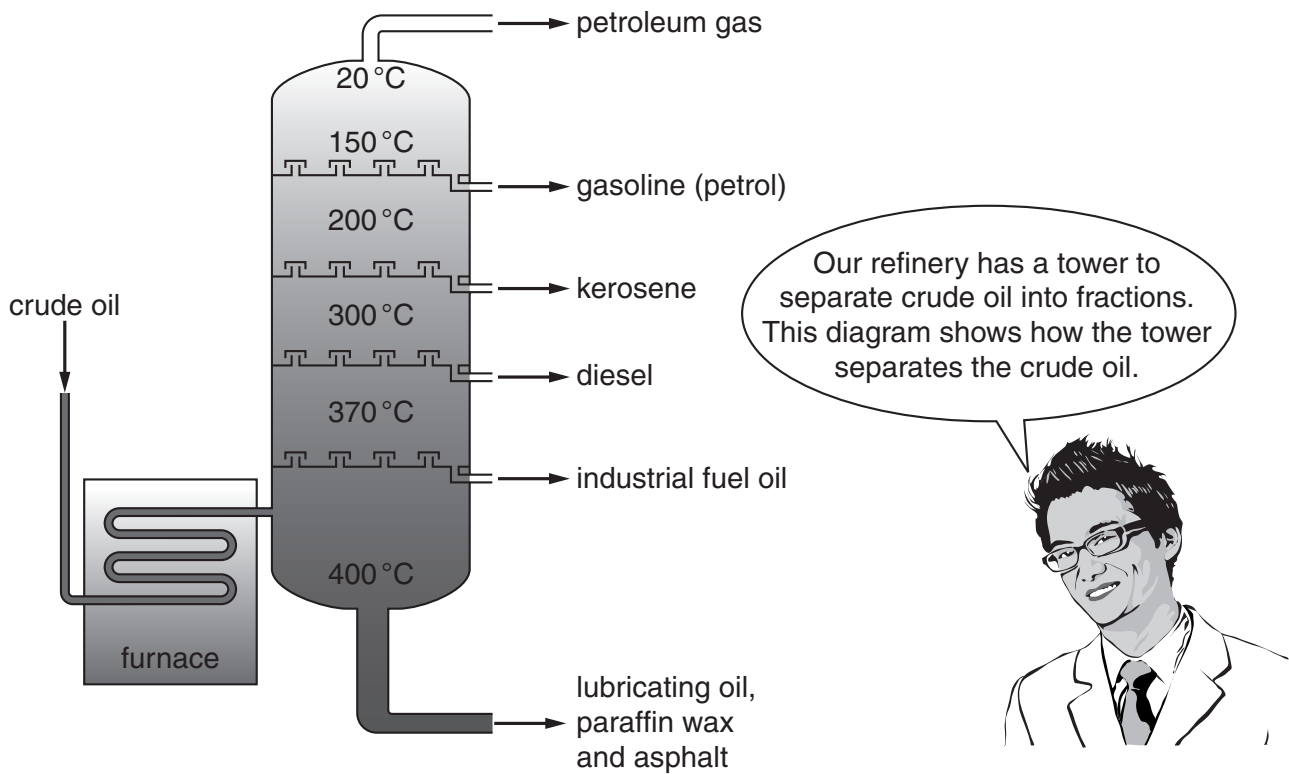
(c) The new pitch was developed by a team of scientists.

Write about how scientists help to develop new products such as poly(ethene) pitches.

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

[Total: 10]

3 Joe visits an oil refinery. A guide shows him how crude oil is separated into useful products.



(a) What is the name for this process?

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

fractional distillation

industrial filtration

thermal decomposition

[1]

(b) Which of the following statements about the process are correct?

Put a tick (✓) in the boxes next to **two** correct statements.

the crude oil is cooled before it enters the tower

the tower is coolest at the top

the process produces compounds for use as fertilisers

many of the products are flammable

[2]

(c) Write down the names of two products of the process and how they are used in everyday life.

Name of product 1 Use

Name of product 2 Use

[2]

(d) The table shows some information about three compounds from crude oil.

formula of compound	fraction
C_8H_{18}	petrol
$C_{12}H_{26}$	diesel
C_3H_8	petroleum gas

(i) All these compounds are **organic**.

Explain what organic means.

..... [1]

(ii) Which of the following compounds is organic?

Put a (ring) around the correct answer.



[1]

(e) Oil rigs extract oil from under the sea bed.

In the 1980s many new oil rigs were built in the North Sea near Aberdeen.

Local people were not sure if the rigs would bring advantages or harm to the local area.

(i) Suggest two ways that the rigs might cause **harm** to the local area.

1

2 [2]

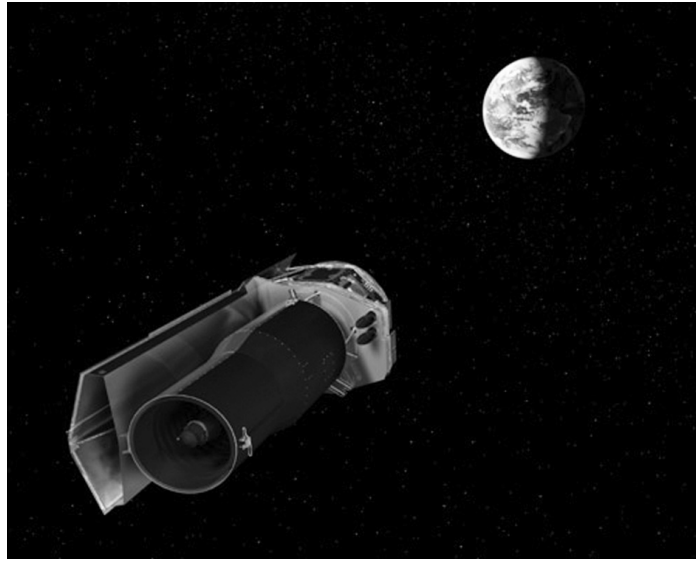
(ii) Suggest one **advantage** of the oil rigs to local people.

..... [1]

[Total: 10]

4 Astronomers use space telescopes to study the Universe.

This is a picture of the Spitzer infrared space telescope.



The advantage of a space telescope is that it is above the Earth's atmosphere.

The gases in the Earth's atmosphere absorb some parts of the electromagnetic spectrum.

(a) (i) Which **two** gases make up most of the Earth's atmosphere?

..... and [2]

(ii) Name a gas in the Earth's atmosphere that has increased in amount because we burn fossil fuels.

..... [1]

(b) (i) This diagram shows some regions of the electromagnetic spectrum.

Complete the diagram.

.....	microwave	infrared	ultraviolet	X-ray	gamma
-------	-----------	----------	-------	-------------	-------	-------

[2]

(ii) The frequency of the waves changes across the electromagnetic spectrum.

What does the word frequency mean?

.....
 [1]

(c) Astronomers have found out a lot about the Universe using telescopes.

air

big bang

expanding

light years

moving

nucleus

stars

Use some of the words from the list to complete the following sentences.

The galaxies are made up of

Astronomers measure distances to galaxies in

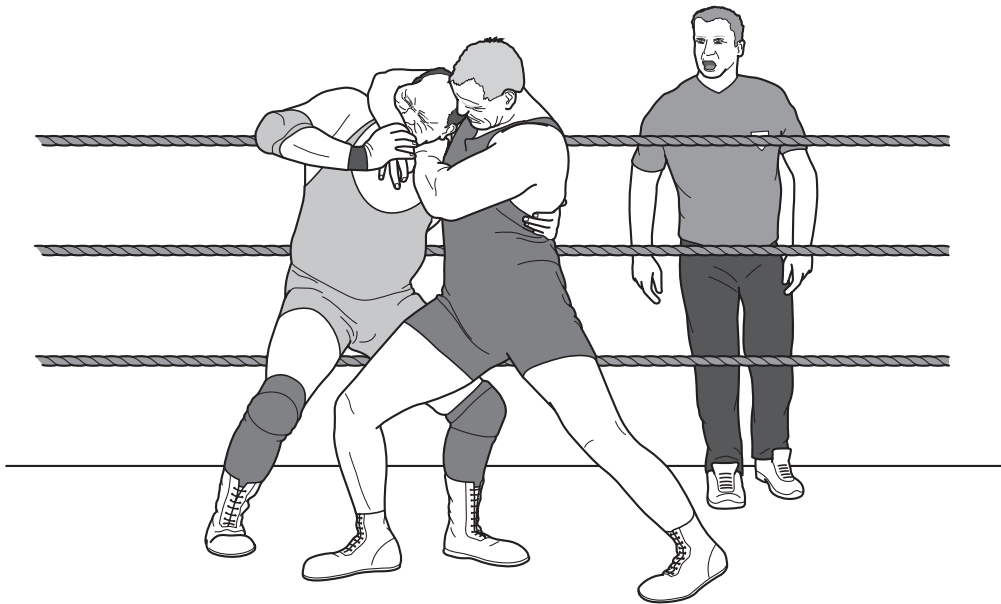
Most galaxies are moving away from us, this is because the Universe is

This can be explained if the Universe started with a

[4]

[Total: 10]

5 Recent research has shown that some diseases can be easily passed between wrestlers during a wrestling match.



(a) (i) Explain how a healthy wrestler may become infected with harmful microorganisms during a wrestling match.

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

(ii) Referees stand near to the wrestlers.

Referees are far less likely than wrestlers to catch diseases during a wrestling match.

Suggest why.

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

(b) Viruses are one type of microorganism that can cause disease.

Which disease in humans is caused by a virus?

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

- athlete's foot measles ringworm tuberculosis**

[1]

(c) Scientists have suggested two ways of stopping the spread of viruses.

(i) The scientists advise all wrestlers to get a vaccination.

Explain how a vaccination works.

Your answer should include:

- what is in a vaccine
- how it gets into the body
- what happens in the body.

.....
.....
.....
.....

[3]

(ii) The scientists have also suggested testing all wrestlers for infectious diseases before they fight.

How will this stop the spread of disease?

.....
.....

[1]

(d) Some virus infections can damage the heart.

A wrestler with a damaged heart does not fight as well.

Which of the following will result from a damaged heart?

Put a tick (✓) in the boxes next to the **two** correct answers.

oxygen and glucose will be moved around the body too quickly

waste products build up in cells

lung capacity is reduced

less oxygen will be in the blood

[2]

[Total: 10]

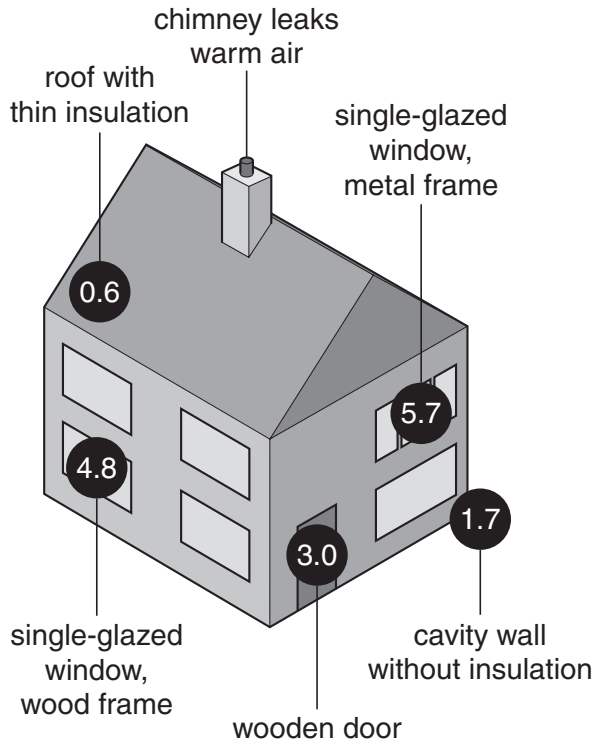
6 Simple home improvements can save a lot of energy.

Look at the diagram comparing energy loss in two types of house.

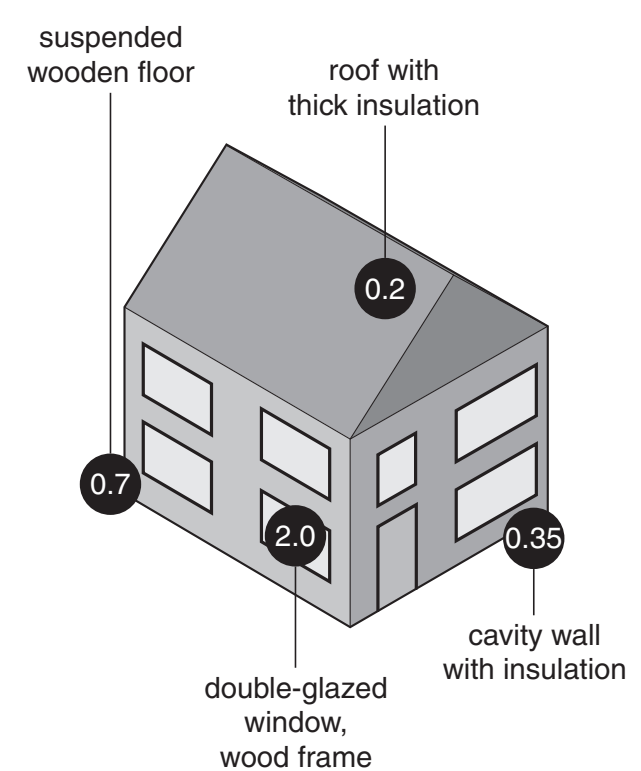
The bigger the U-value the more heat is lost.

KEEPING THE HEAT IN

bad house



good house



Key: ● = U-value (rate of heat loss)

(a) Use the information on the diagram to answer the following questions.

(i) How much does the use of cavity wall insulation **change** the U-value?

answer [1]

(ii) Wood and metal framed windows are used.

Which is the better insulator?

Explain how you worked out your answer.

.....

 [2]

(iii) The U-value for the roof is less in the 'good house'.

Suggest two changes that reduce the heat loss compared to the 'bad house'.

- 1
- 2 [2]

(b) A double-glazed window has a U-value of 2 watts per square metre per degree Celsius.

This means a one metre square window which is 1 °C warmer on the inside will lose 2 watts.

(i) How many watts would a 4 square metre window lose per degree Celsius?

answer watts per degree Celsius [1]

(ii) How many watts would a one square metre window lose if the temperature was 5 °C warmer inside the house?

answer watts [1]

(c) One major source of heat loss is air leakage.

Warm air escapes from the top of the house and cool air is drawn in lower down.

Which type of energy transfer process is involved in heat loss by air leakage?

Put a (ring) around the correct answer.

combustion conduction convection radiation

[1]

(d) The parts of the house that lose the most heat can be found using thermal imaging cameras.

The camera shows the different temperatures of each part of the house.

(i) Which part of the 'bad house' would show the highest temperature?

..... [1]

(ii) Which type of electromagnetic wave is used by thermal imaging cameras?

..... [1]

[Total: 10]

END OF QUESTION PAPER

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