Candidate forename		Candidate surname	

Centre number						Candidate number				

OXFORD CAMBRIDGE AND RSA EXAMINATIONS

GCSE

A212/01

TWENTY FIRST CENTURY SCIENCE

SCIENCE A

Unit 2: Modules B2 C2 P2 (Foundation Tier)

FRIDAY 22 JUNE 2012: Afternoon

DURATION: 40 minutes
plus your additional time allowance

MODIFIED ENLARGED

Candidates answer on the Question Paper.

OCR SUPPLIED MATERIALS:

None

OTHER MATERIALS REQUIRED:

Pencil
Ruler (cm/mm)

READ INSTRUCTIONS OVERLEAF

DC (CW/CGW) 12MEP06379 64617/2

INSTRUCTIONS TO CANDIDATES

- **Write your name, centre number and candidate number in the boxes on the first page. Please write clearly and in capital letters.**
- **Use black ink. HB pencil may be used for graphs and diagrams only.**
- **Answer ALL the questions.**
- **Read each question carefully. Make sure you know what you have to do before starting your answer.**
- **Write your answer to each question in the space provided. Additional paper may be used if necessary but you must clearly show your candidate number, centre number and question number(s).**

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 42.**

Answer ALL the questions.

1 This is a question about materials used to make fibres.

(a) Which of these materials is synthetic?

Put a (ring) around the correct answer.

COTTON

NYLON

SILK

WOOL

[1]

(b) Fibres are often made from the chemicals in crude oil.

Complete each sentence below by choosing the BEST word from this list.

BURNED

CARBON

HYDROCARBONS

HYDROGEN

POLYMERS

REACTED

REFINED

Crude oil is a mixture of _____ .

Crude oil is _____ to make fuels and raw materials for chemical synthesis.

Fibres are made by joining together small molecules to make long chain molecules called _____ . **[3]**

(c) Crude oil is used to make fuels and lubricants, and is used for chemical synthesis.
What percentage of crude oil is used for chemical synthesis?
Put a (ring) around the correct answer.

4

50

75

95

[1]

[Total: 5]

2 This question is about glass and plastic beakers used for drinks.

The table (opposite) shows the energy used, and the greenhouse gases made, at different stages of the life cycle for a glass beaker and a plastic beaker.

(a) Use the information in the table to find out if the following statements are TRUE or FALSE.

Put a tick (✓) in the correct box next to each statement.

TRUE	FALSE	
☐	☐	**The energy used for a glass beaker over these three stages is 11.9 MJ.**
☐	☐	**More energy is used for a glass beaker over these three stages than for a plastic beaker.**
☐	☐	**Less greenhouse gases are made when recycling a glass beaker than when recycling a plastic one.**

[2]

	GLASS		PLASTIC	
	ENERGY USED IN MJ	GREENHOUSE GASES MADE IN g of CO_2	ENERGY USED IN MJ	GREENHOUSE GASES MADE IN g OF CO_2
MAKING THE BEAKERS FROM THE RAW MATERIALS	4.4	1.6	5.4	2.0
TRANSPORTING THE BEAKERS TO THE SHOPS	3.0	2.1	1.2	0.8
RECYCLING THE BEAKERS	4.5	1.5	1.8	0.5

(b) If the beakers are not recycled then they are dumped into a landfill site.

Recycling uses MORE energy than dumping into a landfill site.

Recycling makes MORE pollution than dumping into a landfill site.

Explain why many people think that it is better to recycle the beakers than to dump them into a landfill site.

_____

_____

_____

_____

_____ **[2]**

[Total: 4]

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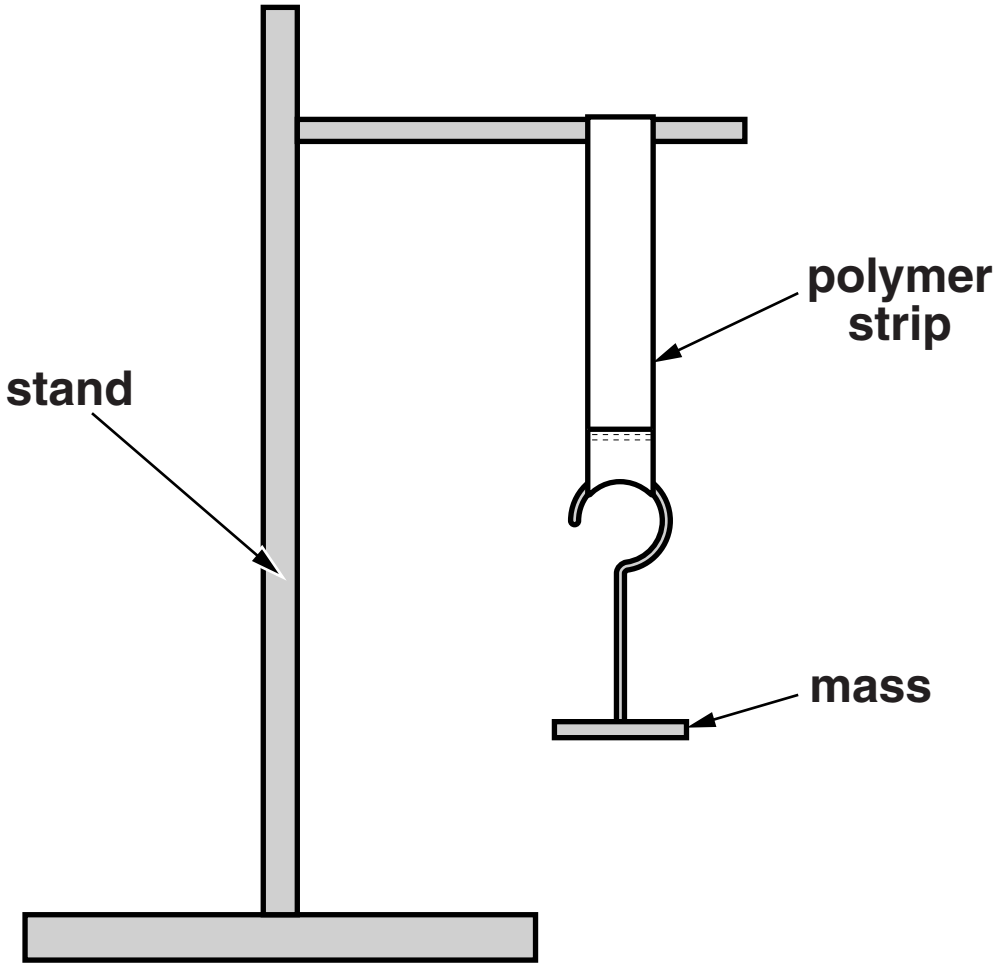
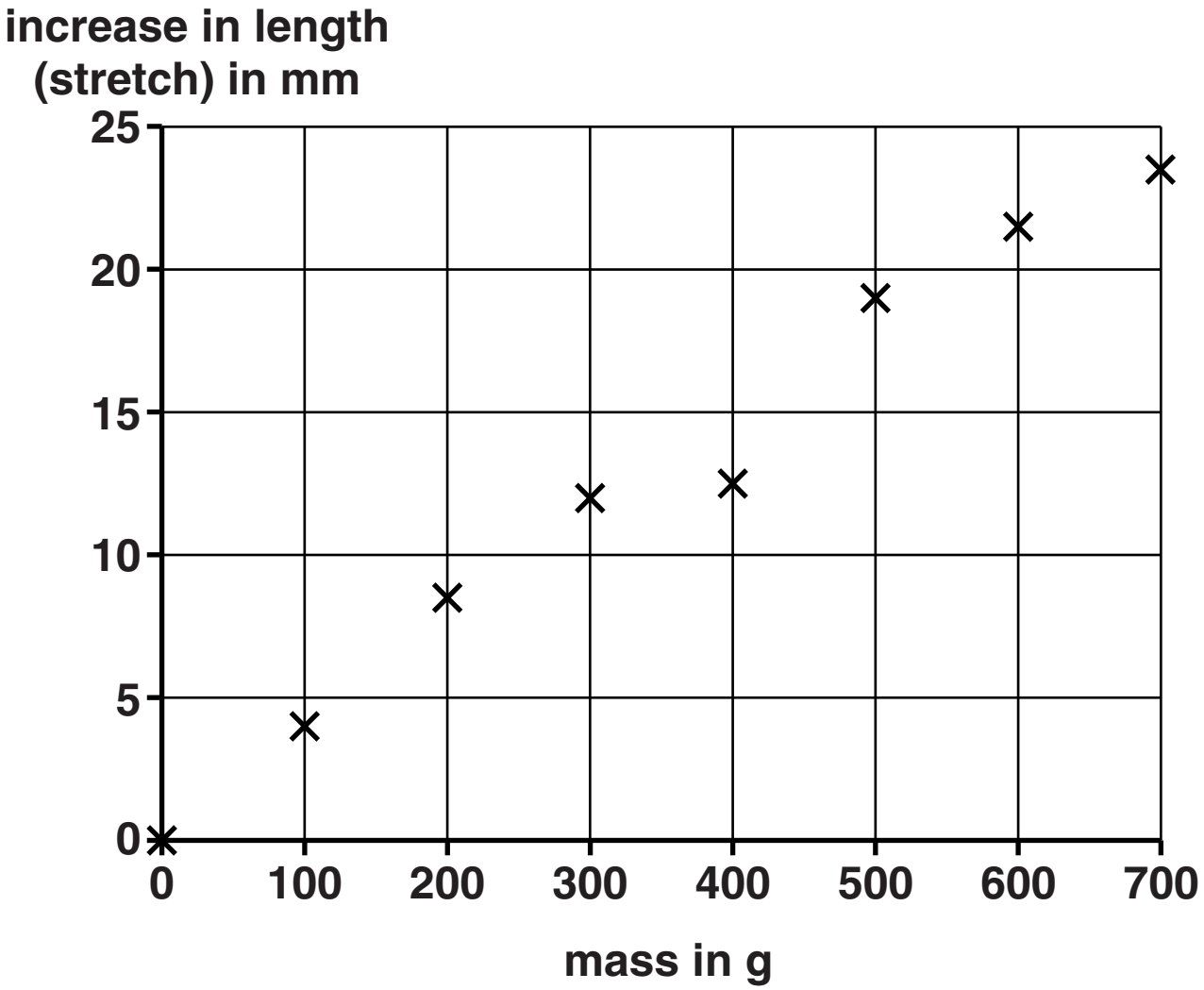
3 Rebecca investigates how the length of a polymer strip changes as the mass hanging on it increases.
She hangs a 100 g mass on the end of a polymer strip, as shown in the diagram.
She measures the increase in length (stretch) of the polymer strip.
She adds another 100 g mass and measures the stretch again.
She repeats this until the total mass is 700 g.



Look at the graph of Rebecca's results.



Use the graph to answer these questions.

(a) (i) What is the increase in length when a 100 g mass is used?

_____ **mm**

[1]

(ii) What is the largest stretch shown on the graph?

_____ **mm**

[1]

(b) (i) One of the points on the graph is an outlier.

Draw a (ring) around the outlier on the graph.

[1]

(ii) Why do you think it is an outlier?
Suggest what Rebecca can do about this outlier.

_____

_____

_____

_____

_____ **[2]**

[Total: 5]

4 Microwave ovens and mobile phones both use microwaves.

(a) Microwave ovens are NOT dangerous to the user.

Which of the following statements explains why?

Put a tick (✓) in the box next to the correct answer.

- ☐ **The user never goes near the microwave oven.**
- ☐ **The walls and door of the oven stop microwaves escaping.**
- ☐ **Microwaves are part of the electromagnetic spectrum.**
- ☐ **Microwave ovens heat food very quickly.**

[1]

(b) Microwave ovens heat food very quickly. Mobile phones cannot be used to cook food.

Explain

- **how microwaves heat food**
- **why mobile phones cannot cook food.**

_____

_____

_____ **[2]**

[Total: 3]

5 This question is about electromagnetic radiation travelling from the Sun to the surface of the Earth. Use words from this list to complete the sentences below.

PHOTONS

ELECTRONS

WAVES

ABSORBED

EMITTED

DEPOSITED

The beam of electromagnetic radiation consists of 'packets' of energy called _____ .

Not all of the radiation entering the Earth's atmosphere reaches the surface of the Earth, because some of it is _____ .

[2]

[Total: 2]

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6 Read this article.

EVERYBODY LIKES SUNNY WEATHER!

Sunlight is a source of natural light and energy. It is good for our general health and makes us feel good.

Although sunbathing may be enjoyable it is important to remember that too much exposure to sunlight is a health hazard. The ultraviolet (UV) radiation in sunlight can harm the skin.

Sunburn often affects skiers, climbers and trekkers in the mountains. The higher you go, the stronger the Sun's UV rays are.

The Sun's rays can also pass through water. When swimming, people can underestimate their exposure to sunlight because of the cooling effect of the water.

(a) Which of the following actions protect people against damage caused by sunlight?

Put ticks (✓) in the boxes next to the TWO correct actions.

- ☐ **Keeping cool by swimming in the sea.**
- ☐ **Putting sun-screen on burnt skin before going to bed.**
- ☐ **Staying indoors in the daytime.**
- ☐ **Sunbathing by the side of a swimming pool.**
- ☐ **Wearing cotton clothes that cover the body.**

[2]

(b) Suggest reasons why people go skiing and mountain climbing, even though there is a risk from sunlight.

You should refer to both RISK and BENEFIT in your answer.

_____

_____

_____

_____

_____

_____ **[3]**

[Total: 5]

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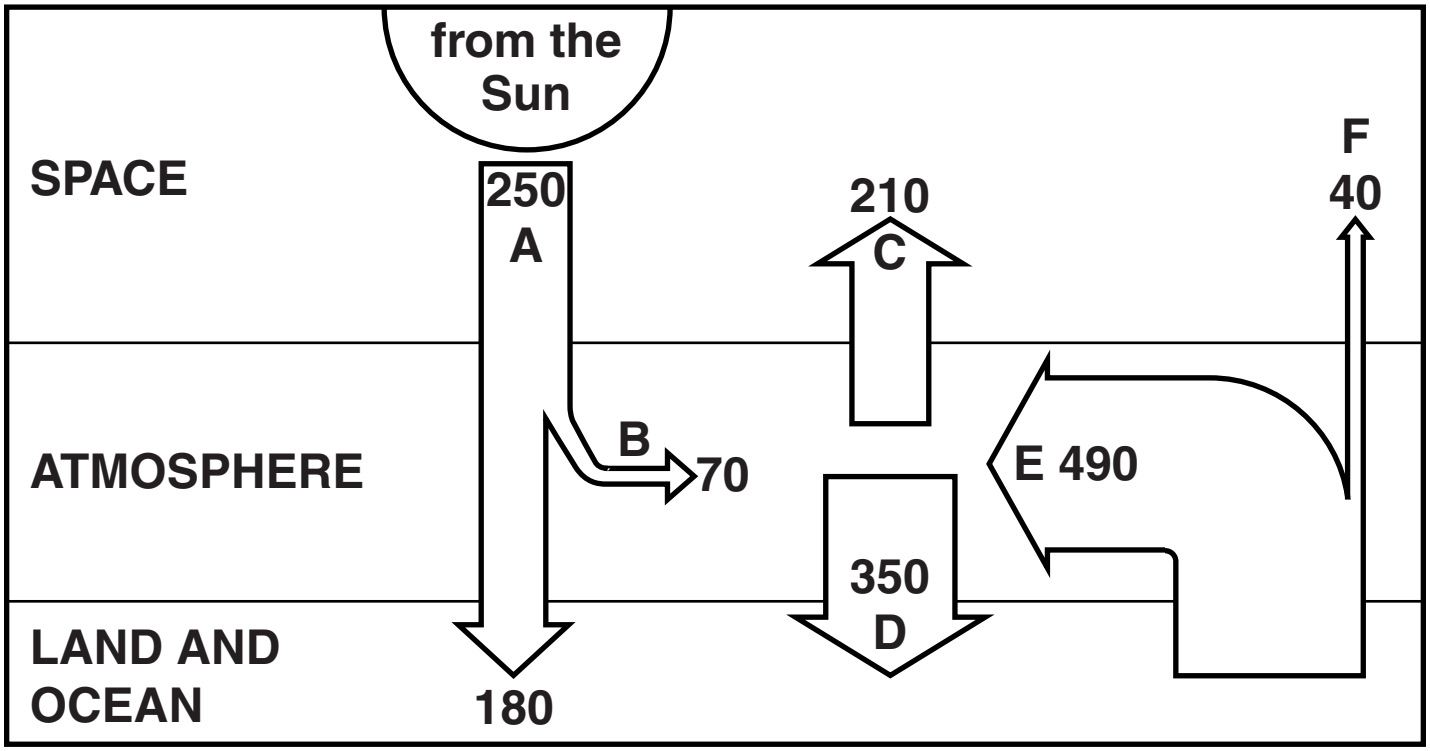
7 **The diagram shows energy transfers related to global warming.**



The numbers on the diagram represent the amount of energy transferred in joules per m^2 per second, averaged over 24 hours. For example, the average energy from the Sun (A) reaching the top of the Earth's atmosphere is 250 joules per m^2 per second.

(a) (i) What is the total energy, in joules per m^2 per second, emitted into space?

Put a (ring) around the correct answer.

40

70

210

250

490

[1]

(ii) What is the total energy, in joules per m^2 per second, reaching the land and ocean?

Put a (ring) around the correct answer.

40

180

350

490

530

[1]

(b) If the concentration of greenhouse gases in the atmosphere increases, some of the energy transfer values will change causing the atmosphere to warm up.

(i) The atmosphere warms up but the energy from the Sun stays the same.

This is because TWO of A, B, C, D, E and F have increased.

Which TWO?

answer _____ and _____[1]

(ii) Which ONE of A, B, C, D, E and F is unaffected by the concentration of greenhouse gases?

answer _____ [1]

[Total: 4]

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8 (a) Antibiotics have to be tested before they can be prescribed by doctors.

Human trials are carried out on healthy volunteers and volunteers with the illness.

For each type of volunteer, what are the antibiotics tested for?

Put a tick (✓) in the correct box in each row (opposite) to show whether the antibiotic is tested for EFFECTIVENESS ONLY, for SAFETY ONLY or for EFFECTIVENESS AND SAFETY.

VOLUNTEER	THE ANTIBIOTIC IS TESTED FOR ...		
	... EFFECTIVENESS ONLY.	... SAFETY ONLY.	... EFFECTIVENESS AND SAFETY.
healthy			
ill			

[2]

(b) Bacteria can become resistant to antibiotics.

What can we do to help prevent this?

Put ticks (✓) in the boxes next to the TWO correct answers.

- ☐ **Always complete a course of treatment.**
- ☐ **Only take antibiotics when necessary.**
- ☐ **Stop taking antibiotics when you feel better.**
- ☐ **Take antibiotics for all illnesses.**
- ☐ **Test antibiotics on animals before giving them to humans.**

[2]

[Total: 4]

9 (a) A system in Fred's body has cells that destroy microorganisms.

What is this system called?

Put a (ring) around the correct answer.

EXCRETORY

IMMUNE

NERVOUS

SENSORY

[1]

(b) Vaccinations provide protection against diseases.

What does a vaccination contain?

_____

_____ **[2]**

(c) Fred has many vaccinations before he starts school.

The table shows the vaccinations given to Fred in the first three years of his life.

DISEASES VACCINATED AGAINST
polio
diphtheria
tetanus
measles
mumps
rubella

(i) Explain why Fred needs different vaccinations.

_____

_____

_____

_____

_____ **[2]**

(ii) When Fred is 13 years old, he needs to be vaccinated against tetanus again.

Suggest why Fred needs more than one vaccination against tetanus.

_____

_____ **[1]**

(d) Some people think that vaccinations should be made compulsory.

What reason could they give for this?

Put a tick (✓) in the box next to the correct answer.

- ☐ **There are side-effects that could be harmful for some people.**
- ☐ **It would prevent large numbers of people from getting the disease.**
- ☐ **Individuals may get the disease.**
- ☐ **Some children who are vaccinated will get a mild form of the disease.**

[1]

[Total: 7]

10 This question is about heart disease.

(a) Complete these sentences about the heart.

The heart needs its own blood supply to provide _____ for the muscle cells and remove _____ from the muscle cells.

A build up of _____ in the arteries supplying the heart muscle can cause a heart attack. [2]

(b) Jane visits her doctor.

She is advised to make changes to her lifestyle to reduce the risk of a heart attack.

Put a tick (✓) in the correct box for each row to show if the lifestyle factor increases or decreases the risk.

LIFESTYLE FACTOR	INCREASES RISK	DECREASES RISK
excessive alcohol intake		
regular exercise		
diet high in saturated fat		
smoking		
stress		

[1]

[Total: 3]

END OF QUESTION PAPER