

Candidate Forename		Candidate Surname	
--------------------	--	-------------------	--

Centre Number						Candidate Number				
---------------	--	--	--	--	--	------------------	--	--	--	--

**OXFORD CAMBRIDGE AND RSA EXAMINATIONS  
GENERAL CERTIFICATE OF SECONDARY EDUCATION**

**A336/01**

**TWENTY FIRST CENTURY SCIENCE  
ADDITIONAL APPLIED SCIENCE A**

**Materials and Performance  
(Foundation Tier)**

**WEDNESDAY 24 JUNE 2009: Morning**

**DURATION: 45 minutes**

**SUITABLE FOR VISUALLY IMPAIRED CANDIDATES**

**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)**

**READ INSTRUCTIONS OVERLEAF**

## **INSTRUCTIONS TO CANDIDATES**

- **Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes on the first page.**
- **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.**
- **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 36.**

**BLANK PAGE**

Answer ALL the questions.

1 Maria is a science technician. She is preparing samples of materials for use in lessons.

(a) She puts the samples in trays to show the different classes of materials.

Draw a straight line from each MATERIAL to its CLASS.

MATERIAL

CLASS

brick

ceramic

copper

composite

rubber

metal

polymer

[3]

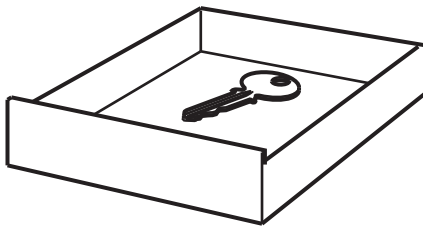
(b) Maria makes three cards, A, B and C to put with the samples.

**Card A**  
  
**stiff and brittle**  
  
**insulators  
of heat and  
electricity**

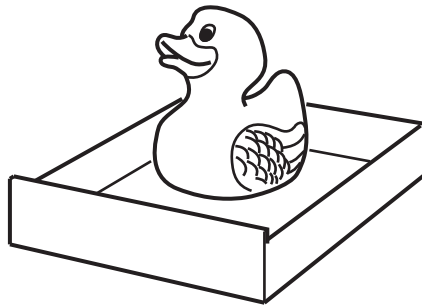
**Card B**  
  
**shiny and  
malleable**  
  
**good conductors  
of heat and  
electricity**

**Card C**  
  
**often flexible**  
  
**insulators  
of electricity**

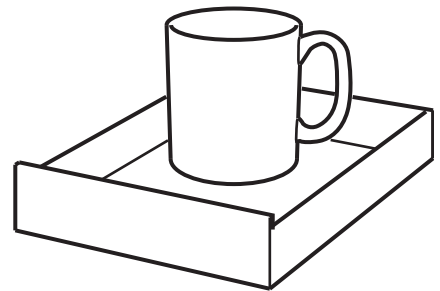
Write the letter A, B, or C under each tray to show where she should put each card.



**metals**



**polymers**



**ceramics**

Card \_\_\_\_\_

Card \_\_\_\_\_

Card \_\_\_\_\_

[2]

(c) Maria also makes some cards for matching the uses of materials to properties needed.

Draw straight lines to link each USE OF MATERIAL with the PROPERTIES NEEDED.

USE OF MATERIAL

PROPERTIES NEEDED

brick  
for a house  
wall

flexible  
tough

copper  
for wiring

stiff  
strong in  
compression

rubber tubing  
for a Bunsen  
burner

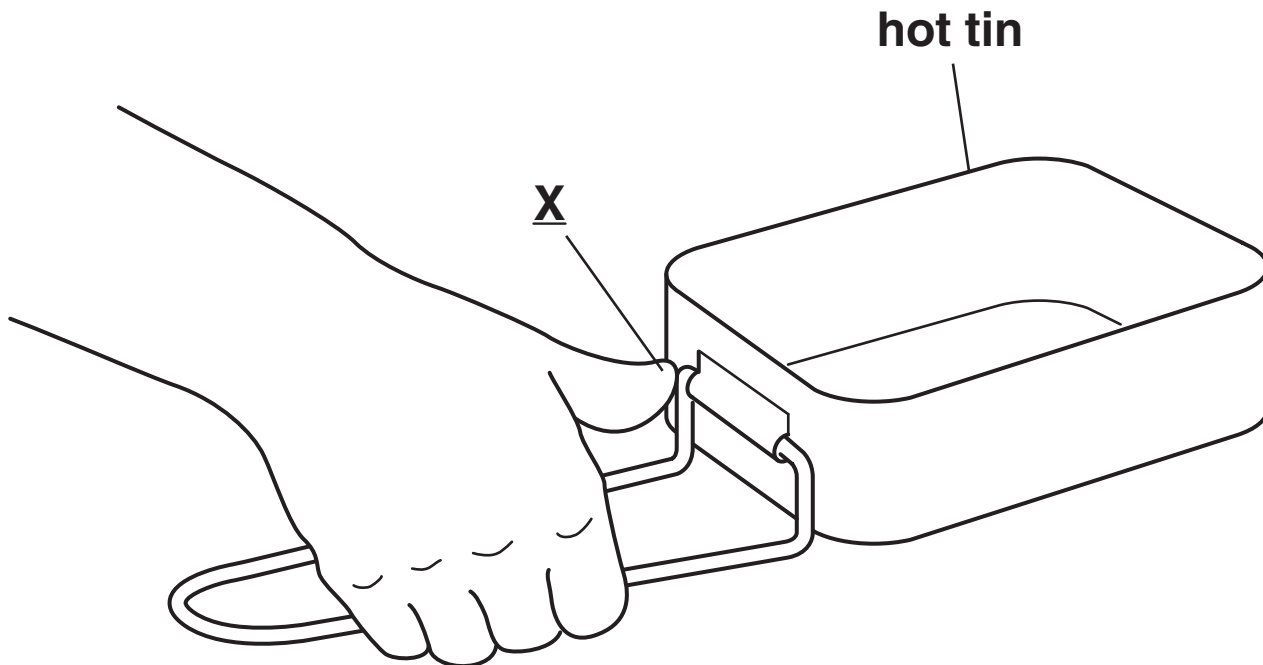
strong  
conductor of  
electricity

[2]

[Total: 7]

2 Simon and Jo are camping. They cook their food in a mess tin.

(a) (i) When Jo touches the hot metal tin with his thumb, he burns his hand.



Which of the four arrows shows the direction in which the heat moves at X?

Put a ring around the correct arrow.



[1]

- (ii) Simon uses a wooden spoon to stir the food.  
The wooden spoon does not feel hot or cold.

Complete the sentence about the spoon.  
Choose words from the list.

CONDENSES

DOES NOT MOVE

MOVES AWAY FROM SIMON

MOVES TOWARDS SIMON

When Simon touches the wooden spoon, the

heat \_\_\_\_\_

\_\_\_\_\_ [1]



- (iii) Wood and metal are good materials to use to make the spoon and the mess tin.

Draw a straight line to link each MATERIAL with its PROPERTY.

<u>MATERIAL</u>	<u>PROPERTY</u>
wood	low thermal conductance
	high thermal expansion
metal	high thermal conductance

[2]

(b) Mess tins are made of aluminium instead of steel.  
Here is some data for aluminium and steel.

<u>METAL</u>	<u>THERMAL CONDUCTIVITY</u> <u>IN W/mK</u>	<u>DENSITY</u> <u>IN kg/m<sup>3</sup></u>	<u>TENSILE STRENGTH</u> <u>IN MPa</u>
aluminium	180	2710	80
steel	15	7860	460

Give TWO reasons why aluminium is better than steel for a mess tin.

Use data from the table.

1 \_\_\_\_\_

\_\_\_\_\_

2 \_\_\_\_\_

\_\_\_\_\_ [2]

[Total: 6]

**3 Robert works in a large glass factory. The factory produces glass for different purposes.**

**(a) Write down the BEST type of glass for each purpose.**

**Choose from the list.**

**TOUGHENED GLASS**

**SELF-CLEANING GLASS**

**LEAD GLASS**

**PHOTOCHROMIC GLASS**

**for safe bus windows**

---

**for a flower vase**

---

**for sunglasses**

---

**[3]**

**(b) The factory produces glass with different optical properties for different purposes.**

**Complete the sentences.**

**Choose words from the list.**

**OPAQUE**

**REFLECTIVE**

**TRANSLUCENT**

**TRANSPARENT**

**Glass for a camera lens is**

---

**Glass for a frosted bathroom window is**

---

**Glass for a mirror is**

---

**[3]**

**[Total: 6]**

**4 Sarah mixes some mortar to build a wall. She wants the mortar to have a good compressive strength.**

**(a) Describe how you could test the COMPRESSIVE strength of a sample of mortar in the school laboratory.**

**You may draw a diagram in the space below to help you answer the question.**

---

---

---

---

**[3]**

(b) Sarah considers adding gravel to the mortar mix. This makes a COMPOSITE material.

ONE of these building materials is a composite. Put a tick (✓) in the box next to the correct composite material.

STEEL-REINFORCED CONCRETE

GLASS

PVC

GOLD

[1]

(c) Give ANOTHER example of a composite material and describe HOW IT IS USED.

---

---

[2]

[Total: 6]

**BLANK PAGE**

5 Chris is a teacher. He uses a projector to give some questions to the class.

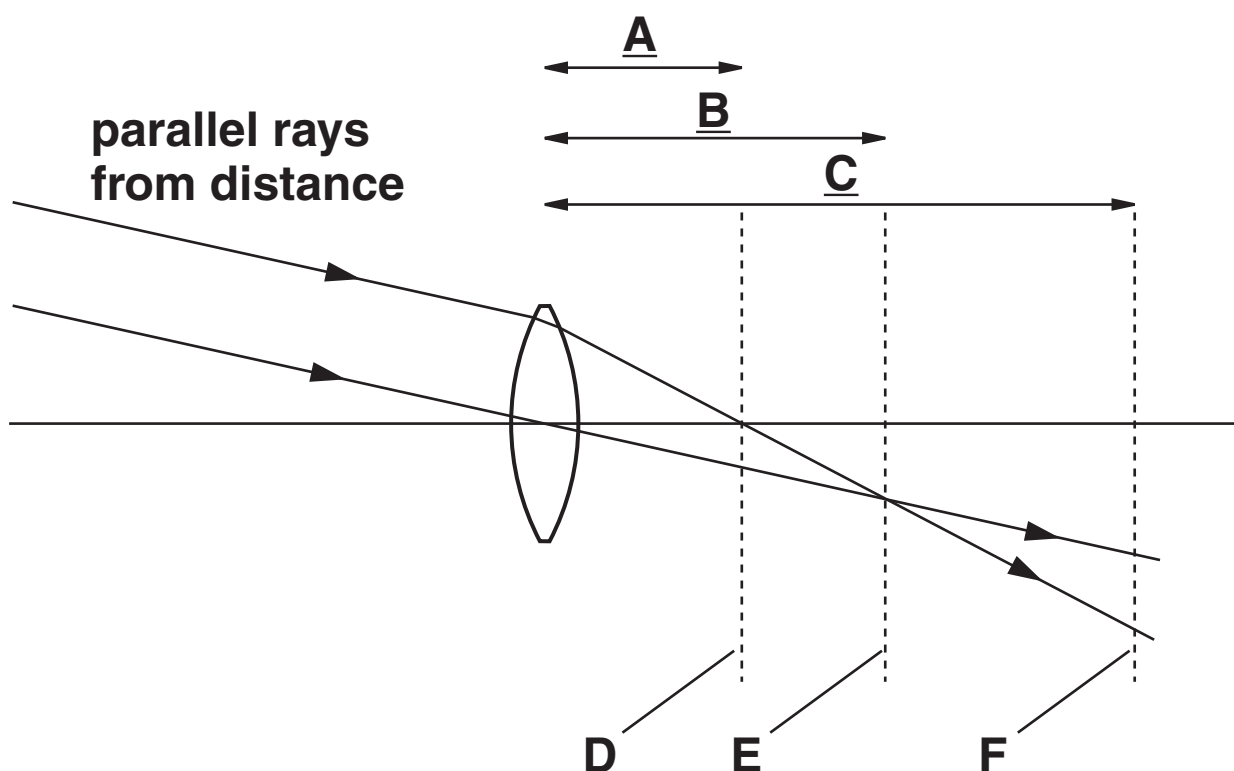
The image formed by the projector is LARGER THAN the original writing.

(a) Give TWO other properties of the image.

1 \_\_\_\_\_

2 \_\_\_\_\_ [2]

(b) Chris shows the class how a convex lens brings rays of light to a focus.





**This ray diagram shows how a lens produces an image of the top of a distant object.**

**(i) Which letter, A, B, C, D, E or F labels the  
FOCAL PLANE? \_\_\_\_\_ [1]**

**(ii) Which letter, A, B, C, D, E or F labels the  
FOCAL LENGTH? \_\_\_\_\_ [1]**

**(c) Chris uses a second, more powerful lens.**

**(i) How is its focal length different from the first lens?**  
\_\_\_\_\_  
\_\_\_\_\_ [1]

**(ii) Write down the unit for measuring the power of a lens.**  
\_\_\_\_\_ [1]

**[Total: 6]**

**6 Eva works for a company which makes cloth for the sails of yachts.**

**The wind blows on the sails with a force that stretches the cloth.**

**Eva receives a complaint that the cloth becomes permanently stretched too easily.**

**(a) (i) If the force on the cloth is small, the cloth goes back to its original shape after being stretched.**

**Give the name for this type of behaviour.**

\_\_\_\_\_ [1]

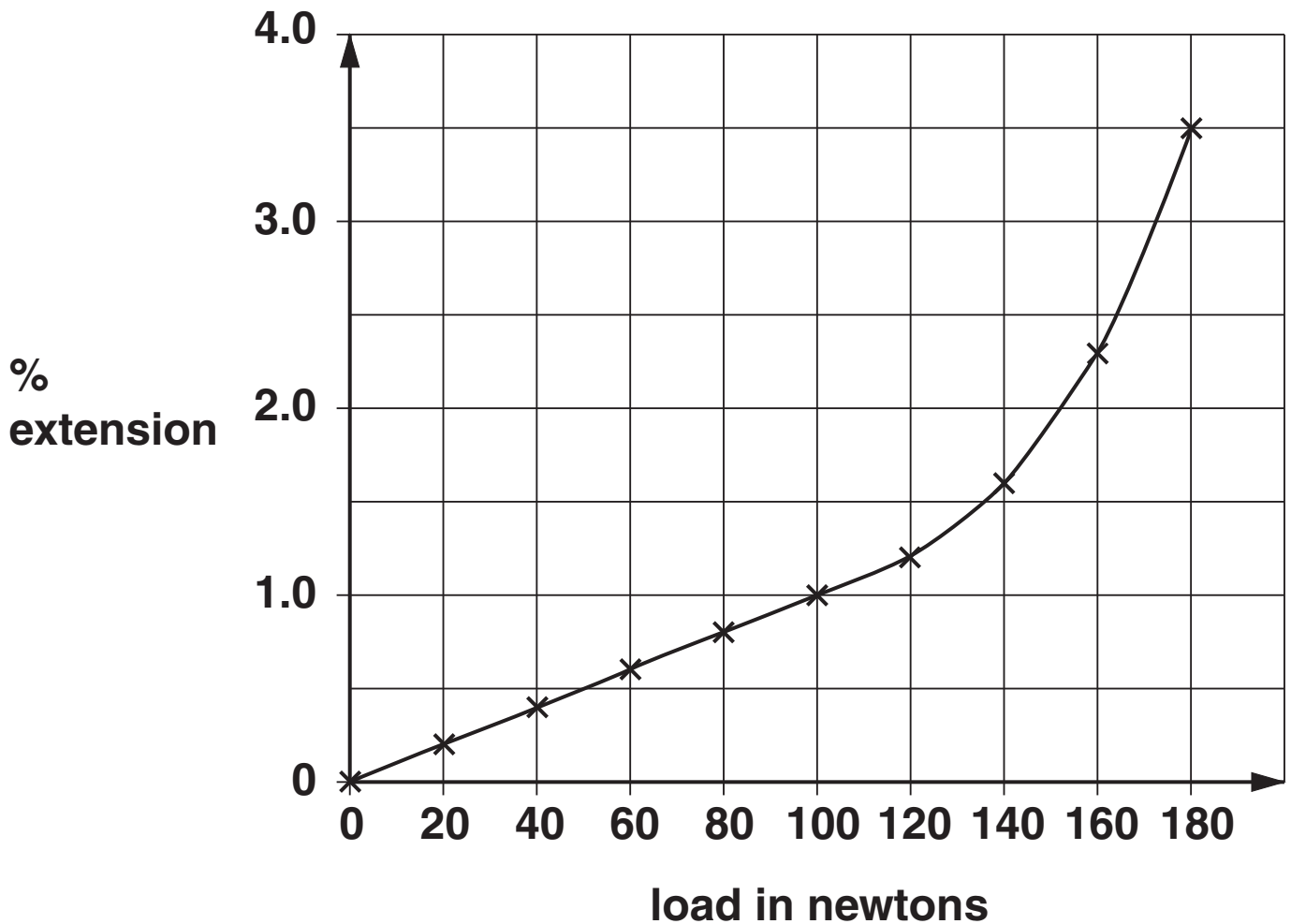
**(ii) If the force on the cloth is too great, the cloth does not go back to its original shape after being stretched.**

**Give the name for this type of behaviour.**

\_\_\_\_\_ [1]

**(b) Eva tests how the cloth behaves when it is stretched.**

**This is the graph of her results:**



**Use the graph to answer these questions.**

**(i) Up to what load does the cloth probably return to its original shape?**

**answer \_\_\_\_\_ N [1]**

**(ii) What is the % extension for this load?**

**answer \_\_\_\_\_ [1]**

- (iii) Cloth for sails should return to the original shape after being stretched by 1%.

Does the cloth meet this requirement?  
Give a reason for your answer.

---

---

[1]

[Total: 5]

**END OF QUESTION PAPER**



### Copyright Information

OCR is committed to seeking permission to reproduce all third-party content that it uses in its assessment materials. OCR has attempted to identify and contact all copyright holders whose work is used in this paper. To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced in the OCR Copyright Acknowledgements Booklet. This is produced for each series of examinations, is given to all schools that receive assessment material and is freely available to download from our public website ([www.ocr.org.uk](http://www.ocr.org.uk)) after the live examination series.

If OCR has unwittingly failed to correctly acknowledge or clear any third-party content in this assessment material, OCR will be happy to correct its mistake at the earliest possible opportunity.

For queries or further information please contact the Copyright Team, First Floor, 9 Hills Road, Cambridge CB2 1PB.

OCR is part of the Cambridge Assessment Group; Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.