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 22 JUNE 2011: 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

DC (LEO/SW) 11MEP06190 46743/1

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. Pencil may be used for graphs and diagrams only.**
- **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).**
- **Answer ALL the questions.**

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.**

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Answer ALL the questions.

1 Mrs Bakewell works in a kitchen. The objects in the kitchen have different MATERIAL PROPERTIES.

(a) Complete each sentence.

Choose the correct property from this list.

brittle

flexible

hard

stiff

weak

A chopping board does not scratch easily. It is

_____ .

A tray keeps its shape when loaded with plates. It is _____ .

[2]

(b) Draw a straight line to link each OBJECT with the PROPERTY it needs.

OBJECT	PROPERTY
	high thermal conductance
A pan which lets heat pass through quickly.	
	low thermal conductance
	high electrical conductance
A glove for picking up hot pans.	
	low electrical conductance

[2]

(c) Mrs Bakewell chooses a new floor covering for the kitchen. It needs certain properties.

Which properties are the most important for a kitchen floor covering?

Put ticks (✓) in the boxes next to the TWO best properties.

brittle	☐
durable	☐
elastic	☐
non-slip	☐
opaque	☐

[2]

[Total: 6]

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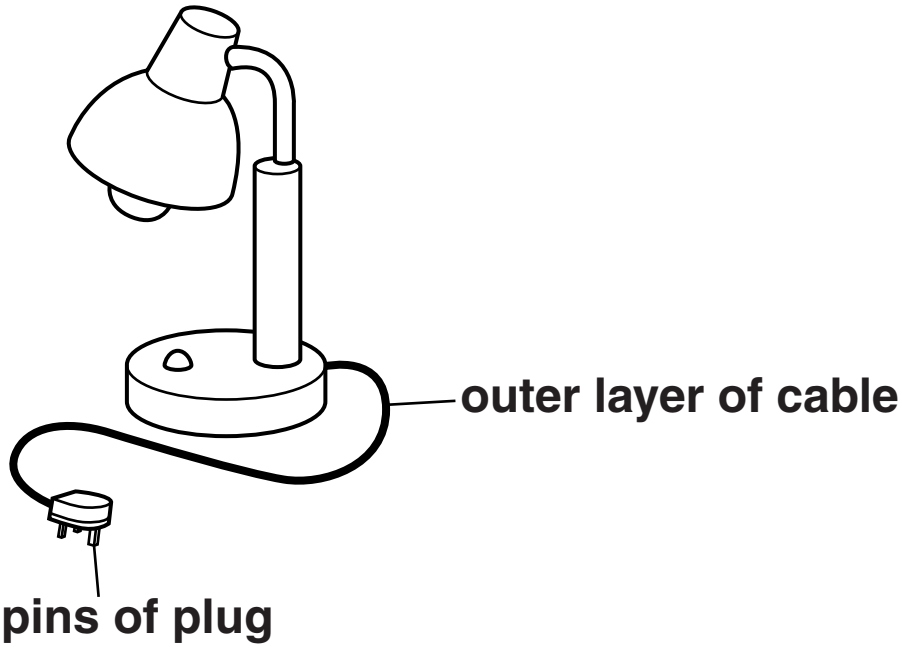
2 Lucia works in a large DIY store which sells lamps.

(a) Each lamp has a cable with a plug.



The cable and the plug need the right ELECTRICAL and MECHANICAL properties.

Complete the table to show the properties.

Choose properties from this list.

brittle

dense

rigid

conductor

insulator

flexible

translucent

PART OF LAMP	ELECTRICAL PROPERTY	MECHANICAL PROPERTY
outer layer of cable		
pins of plug		

[3]

(b) The store sells wall mirrors for decoration.

Write down ANOTHER example of the use of mirrors.

_____

_____ **[1]**

(c) The store sells specialised glass.

Here are four uses of specialised glass.

Give a reason why each SPECIALISED GLASS is needed.

USE	SPECIALISED GLASS	REASON FOR USING THIS TYPE OF GLASS
for a glass door	toughened	_____ _____ _____
for a bathroom window	translucent	_____ _____ _____
a window in a tall building	self-cleaning glass	_____ _____ _____
a stained glass window	tinted	_____ _____ _____

[4]

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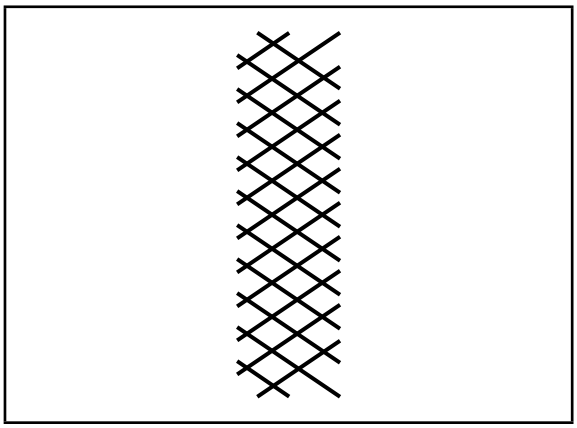
(d) The store sells garden equipment.

Lucia chooses a trellis to support her plants.

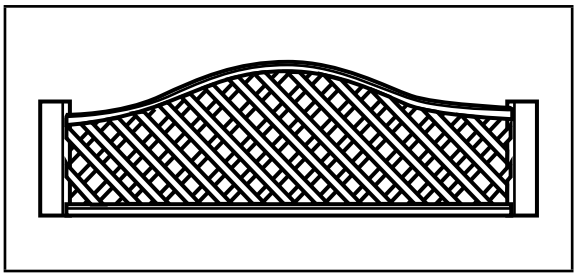
She wants the trellis to be RIGID for good support.

Lucia compares the size and structure of each trellis in the store.

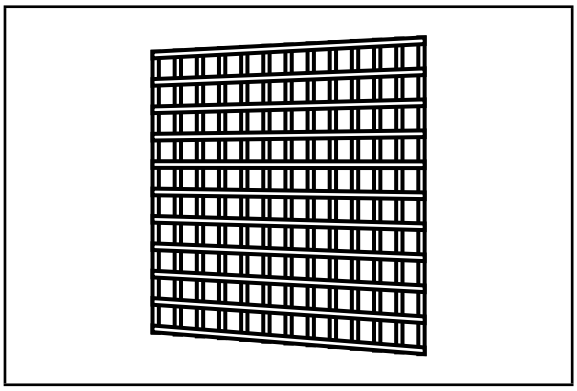
A – tall, narrow trellis thin pieces of wood



B – short, wide trellis thick pieces of wood



C – tall, wide trellis thin pieces of wood



Which trellis, A, B or C, is the most rigid?

answer _____ [1]

[Total: 9]

3 Tim Burrs is a carpenter. He needs to know the properties of wood.

He can then choose wood with the right strength and stiffness.

(a) Give ANOTHER example of a job which needs a good knowledge of material properties.

Give a reason why this knowledge is needed.

_____

_____ **[1]**

(b) Tim builds a framework for a roof.

The roof framework has a safety margin. It can hold more than the weight of the roof.

The roof will not collapse if a person stands on it.

(i) Give another example of a product which needs a safety margin. Explain why the safety margin is needed.

_____

_____

_____ **[2]**

(ii) A building control inspector checks how Tim builds the framework for the roof.

Give ANOTHER example of a job which involves enforcing standards.

_____ **[1]**

(iii) Tim buys building materials which are made according to product standards.

Show the reasons for having product standards.

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

SO PRODUCTS …

… are safe ☐

… cost less ☐

… look smart ☐

… are in fashion ☐

… are fit for purpose ☐

[2]

(c) The European Community has a mark (CE) to show that a product meets the CE standard. Which of these marks indicate that a product meets a standard?

Draw a (ring) around each of the TWO correct marks.

BHS

BS

ISA

ISO

PS

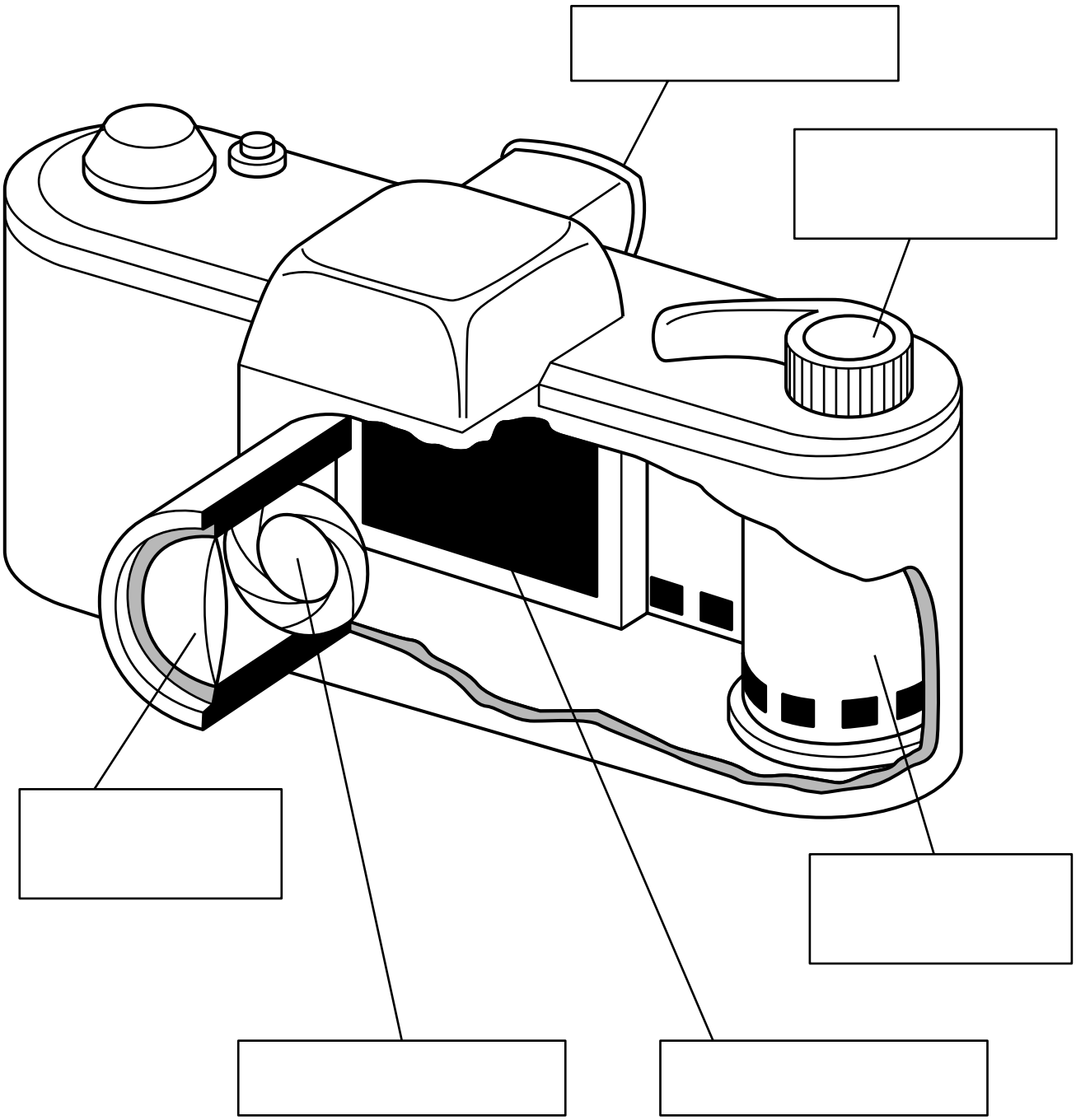
PTO

[2]

[Total: 8]

4 Cara finds out how her camera works.

(a) (i) Write the words APERTURE and SHUTTER in the correct boxes.



[2]

(ii) Cara learns that the camera lens has a special coating.

State the purpose of this coating.

_____ **[1]**

(b) Parallel rays from a distant object arrive at the lens. They change direction as they pass through the lens.

(i) Name the PROCESS which makes the rays change direction.

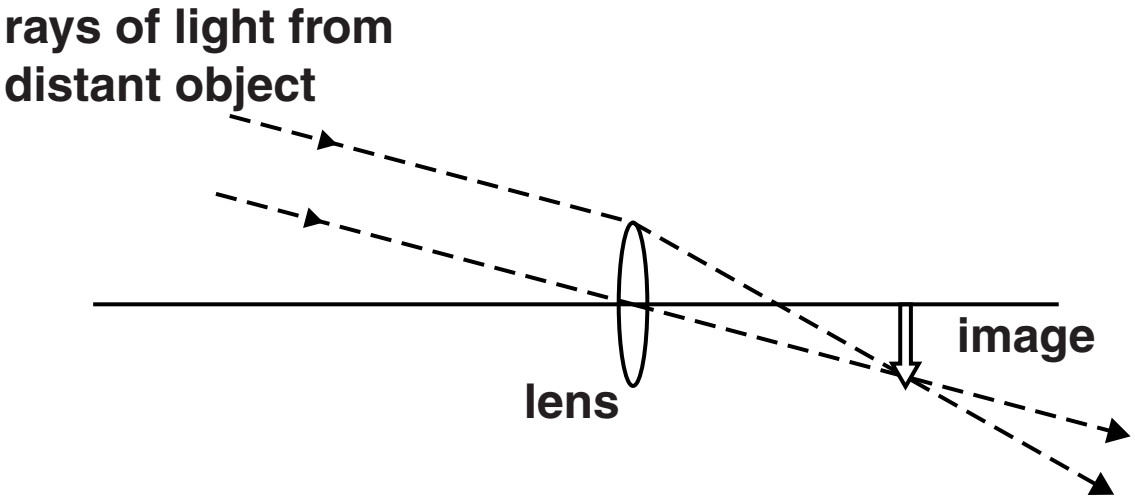
_____ **[1]**

(ii) The change in direction depends on the POWER of the lens.

Write down the unit used for the power of the lens.

_____ **[1]**

(c) The diagram shows how the camera lens focuses parallel rays to make an image.



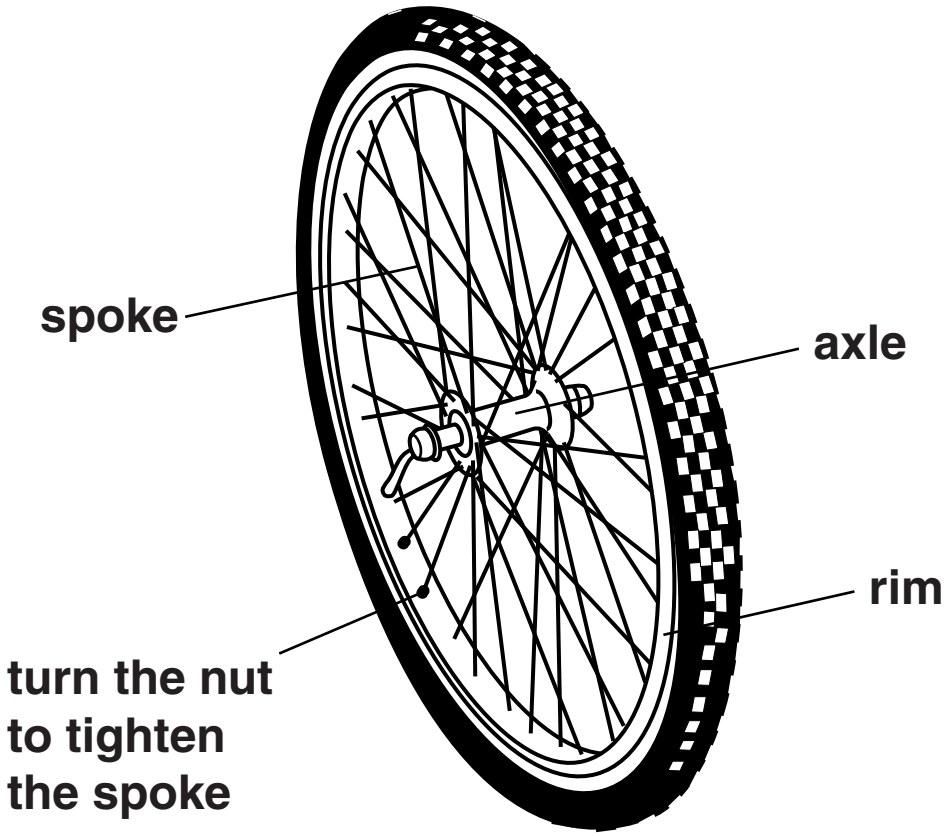
Describe what these words mean. You may draw on the diagram to help your answer.

focal length _____

focal plane _____ **[2]**

[Total: 7]

5 (a) Ravi tests how tightening spokes affects the stiffness of a bicycle wheel.



He clamps the axle firmly and uses a force to make the rim bend (deflect) sideways.

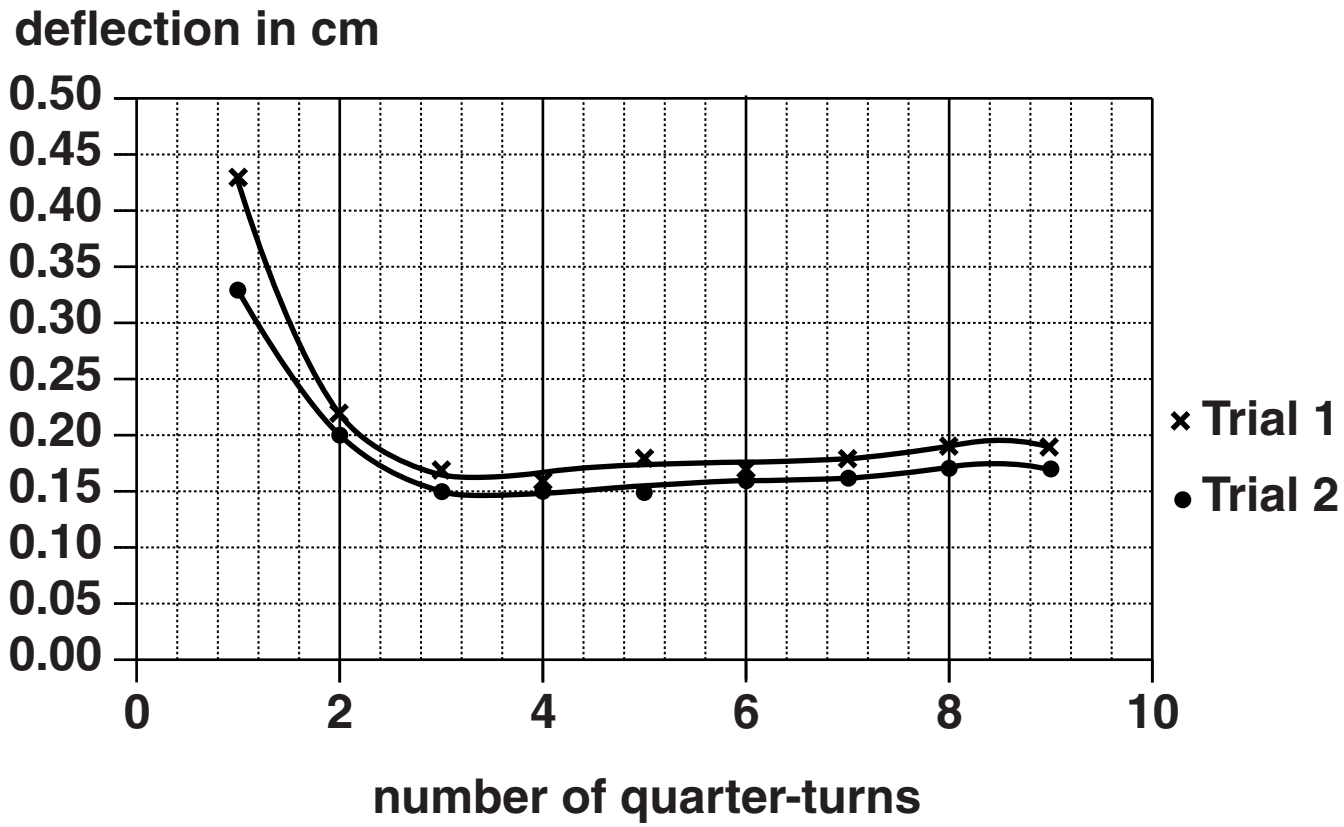
He measures the deflection of the rim.

He then tightens all the spokes by one quarter of a turn and measures the deflection.

He repeats this procedure nine times.

He then repeats the whole of the test to check for reliability.

These are his results.



The graph shows that the wheel is flexible if the spokes are loose and stiff if the spokes are tight.

(i) What is the SMALLEST number of quarter-turns needed for a stiff wheel?

answer _____ quarter-turns [1]

(ii) Are the results reliable?

Explain your answer.

_____

_____

_____

_____ **[2]**

(b) Describe how you would compare the stiffness of samples in a school laboratory.

You may use a diagram to help your answer.

_____

_____

_____ **[3]**

[Total: 6]

END OF QUESTION PAPER

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