

OXFORD CAMBRIDGE AND RSA EXAMINATIONS

LEVEL 1/2

R105/01

**CAMBRIDGE NATIONAL AWARD/
CERTIFICATE IN ENGINEERING DESIGN**

**Design briefs, design specifications
and user requirements**

MONDAY 15 MAY 2017: Afternoon

DURATION: 1 hour

plus your additional time allowance

MODIFIED ENLARGED

Candidate forename		Candidate surname	
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Centre number						Candidate number				
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Candidates answer on the Question Paper.

OCR SUPPLIED MATERIALS:

None

OTHER MATERIALS REQUIRED:

None

READ INSTRUCTIONS OVERLEAF



INSTRUCTIONS TO CANDIDATES

Use black ink. HB pencil may be used for graphs and diagrams only.

Complete the boxes on the first page with your name, centre number and candidate number.

Answer ALL the questions.

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 total number of marks for this paper is 60.

The number of marks for each question is given in brackets [] at the end of each question or part question.

Dimensions are in millimetres unless stated otherwise.

Your quality of written communication will be assessed in questions marked with an asterisk (*).

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Answer ALL the questions.

1 Product 'Life Cycle Analysis' (LCA) is an important consideration for designers.

(a) Complete the table below by adding the LCA considerations in the correct order.

One has been done for you. [4]

Selection of raw material

Recycling of materials

Ease of disassembly

Energy use during operation

1	
2	Energy used in manufacturing
3	
4	
5	

(b) Give THREE ways in which new and emerging materials can contribute to a product's lifecycle.

1 _____

2 _____

3 _____

[3]

(c) Describe how ease of disassembly can contribute to sustainable design.

[3]

2 The creation of a design brief is an important step in the identify stage of the design cycle.

(a) (i) Give TWO factors that may inform the development of a design brief.

1 _____

2 _____

[2]

(ii) State ONE other process carried out in the identify phase of the design cycle.

_____ **[1]**

(iii) Name TWO other phases of the design cycle.

1 _____

2 _____

[2]

(b) Give TWO ways in which market research can be used to update an existing product.

1 _____

2 _____

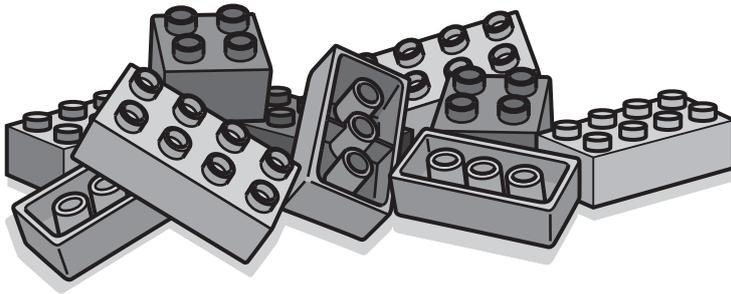
[2]

(c) Describe, using an example, how the function of a new product could be influenced by the target audience.

[3]

3 Fig. 1 shows some children's plastic building blocks.

FIG. 1



(a) Give TWO safety factors that should be considered when designing the children's building blocks.

1 _____

2 _____

[2]

(b) Give TWO reasons why the building blocks have been manufactured using plastic moulding.

1 _____

2 _____

[2]

4 The use of both standard and of pre-manufactured components is an essential part of modern day manufacturing.

(a) The table opposite shows a range of standard and pre-manufactured components.

Complete the table by placing a tick (✓) in the correct column to indicate if the component is standard or pre-manufactured.

One of each has been done for you. [4]

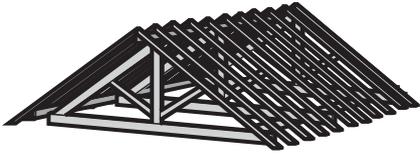
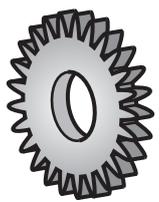
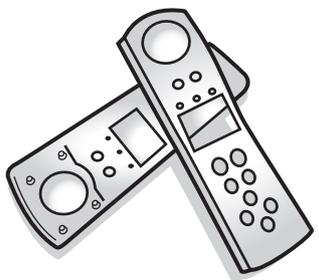
(b) Give THREE reasons why pre-manufactured components may be used in production.

1 _____

2 _____

3 _____

[3]

	Component	Component name	Standard component	Pre-manufactured component
1		Roof truss		
2		M6 Bolt	✓	
3		Car seat		✓
4		Bearing		
5		Gear		
6		Injection moulded casing		

(c) Explain why the scale of manufacture can affect the cost of production.

[3]

5 Fig. 2 shows an electric household kettle.

FIG. 2



(a) State TWO ways the working environment has influenced the design of the kettle.

1 _____

2 _____

[2]

(b) Give THREE aesthetic design features that could be modified to vary the range of kettles.

1 _____

2 _____

3 _____

[3]

(c) Designers may produce virtual or physical prototypes throughout the design development process.

(i) Give TWO methods a designer may use to produce a prototype.

1 _____

2 _____

[2]

(ii) Describe THREE ways that a physical prototype can be used to validate a product.

1 _____

2 _____

3 _____

[3]

6 Designers may take inspiration from iconic products.

(a) (i) Give ONE example of an iconic product.

_____ [1]

(ii) State TWO reasons why the product you have chosen became iconic.

1 _____

2 _____

[2]

(b) Explain why designers may use iconic products as inspiration when developing new designs.

_____ [3]

(c) Explain why a designer may apply for a patent.

[3]

(d) State the meaning of the term 'trademark'.

[1]

END OF QUESTION PAPER

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