

**OCR**

Oxford Cambridge and RSA

**Wednesday 9 January 2019 – Morning****LEVEL 1/2 CAMBRIDGE NATIONAL AWARD/  
CERTIFICATE IN ENGINEERING DESIGN****R105/01** Design briefs, design specifications and user requirements

Candidates answer on the Question Paper.

**OCR supplied materials:**

None

**Other materials required:**

None

**Duration:** 1 hour

Candidate forename		Candidate surname	
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Centre number						Candidate number				
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**INSTRUCTIONS TO CANDIDATES**

- Use black ink. HB pencil may be used for graphs and diagrams only.
- Complete the boxes above 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).
- Do **not** write in the barcodes.

**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 (\*).
- This document consists of **16** pages. Any blank pages are indicated.

2

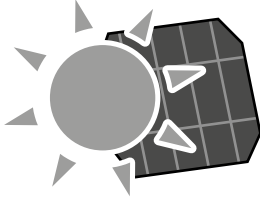




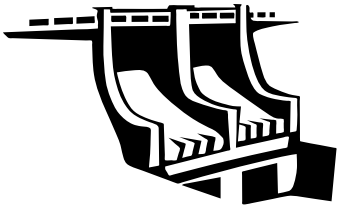
Answer **all** the questions.

1 (a) The use of sustainable resources is critical to sustainable design.

(i) The table below shows a range of resources.

Complete the table by placing a tick (✓) in the correct column to indicate if the resources are sustainable or non-sustainable.

One of each has been done for you.

	Resource	Resource	Sustainable	Non-sustainable
1		Solar		
2		Oil extracted from underground		✓
3		Natural gas		
4		Coal		
5		Wind	✓	
6		Hydroelectric		

3

(ii) Give **two** ways the resources listed within the table for part (a) can contribute to sustainable design.

1 .....

.....

2 .....

.....

[2]

(b) Name **one** stage of a product life cycle.

.....

..... [1]

(c) Explain what is meant by the term Life Cycle Analysis (LCA).

.....

.....

.....

.....

.....

..... [3]

2 The development of a design brief is the first stage of the development of a new product.

(a) Give **two** requirements a client may provide as part of an initial design brief.

1 .....

.....

2 .....

.....

[2]

(b) Explain why the client and designer may create a 'final' brief before creating a design specification.

.....

.....

.....

.....

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.....

.....

[3]

(c) Give **two** reasons why a client may be advised to reduce the number of features of a new product.

1 .....

.....

2 .....

.....

[2]

(d) Explain why a designer would develop manufacturing plans during the design phase of the design cycle.

.....

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.....

.....

..... [3]

6

- 3 (a) The table shows a comparison of 6 materials.

Material	Factors to consider				
	Ease of storage	Easy to process	Lightweight	Strength	Cost
A	3	3	5	7	2
B	7	2	1	1	4
C	2	8	7	3	8
D	4	4	2	7	4
E	6	4	9	8	4
F	2	2	6	6	6

**Suitability: 10 = excellent and 1 = very poor**

Give **two** reasons why material C would be suitable for the production of a prototype.

1 .....

.....

2 .....

.....

[2]

- (b) Give **one** example of a product and a new and emerging technology used in that product.

Product

.....

New and emerging technology

.....

..... [2]

(c) State **two** activities carried out by designers when developing a design concept for a new product.

1 .....

.....

2 .....

.....

[2]

(d) State what is meant by the term 'aesthetics'.

.....

..... [1]

(e) Designers often use virtual (on-screen) computer models when developing prototype products.

Explain why a designer might create a virtual prototype.

.....

.....

.....

.....

.....

..... [3]

4 (a) Fig. 1 shows two drinks bottles.

Bottle **A** is made from plastic. Bottle **B** is made from glass.



Bottle **A**

Bottle **B**

**Fig. 1**

(i) Give **two** benefits of Bottle **B** compared to Bottle **A**.

1 .....

2 .....

[2]

(ii) Give **one** reason why a manufacturer may choose Bottle **A** over Bottle **B**.

.....

[1]



(b) Fig. 2 shows a piston and connecting rod assembly. The connecting rod assembly is manufactured by casting, and the piston is precision machined.

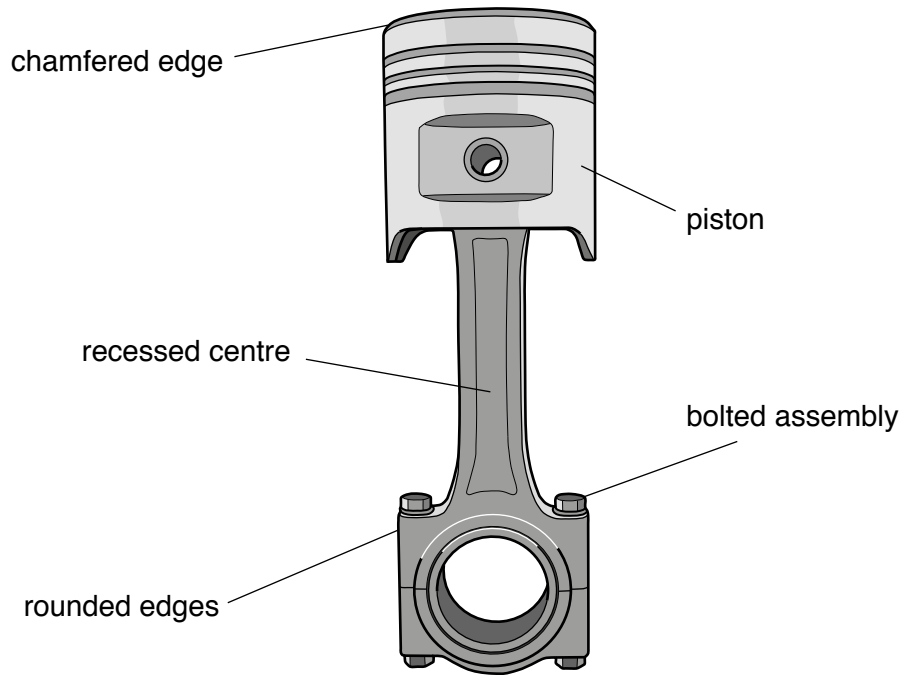


Fig. 2

Give **four** ways in which the piston and connecting rod assembly has been influenced by design for manufacture assembly (DFMA).

- 1 .....
- 2 .....
- 3 .....
- 4 .....

[4]

10

- (c) Explain why designers need to consider the manufacturing process when designing new products.

.....

.....

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..... [3]

5 (a) Fig. 3 shows a typical drawing title block with tolerance information.

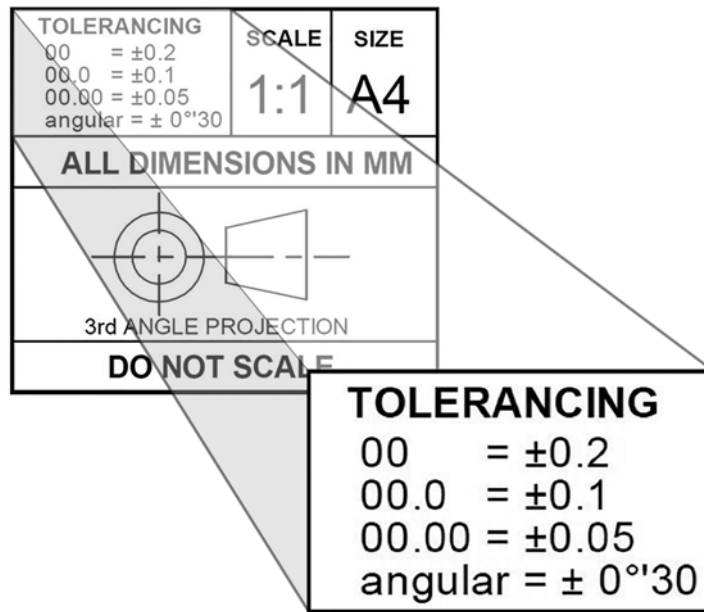


Fig. 3

(i) Using the tolerancing information in Fig. 3, state the upper and lower limits for a dimension of 10.6mm.

Upper .....

Lower .....

[2]

(ii) State what is meant by the angular tolerance in Fig. 3.

.....

.....

[2]

(b) Give **one** impact of a batch of products being produced out of tolerance.

.....

.....

[1]

(c) Give **two** reasons why manufacturers may use pre-manufactured components in the production of new products.

1 .....

.....

2 .....

.....

[2]

(d) Describe, using an example, how a cultural or fashion trend had an impact on the design of a new product.

.....

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.....

.....

[3]

6 (a) Regulations and safeguards are important considerations for designers.

Draw the 'British Standard' kitemark.

[1]

(b) State the difference between durability and reliability.

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

(c) Give **one** way that designers can improve the reliability of a product.

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



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