

OCR

Oxford Cambridge and RSA

Wednesday 10 January 2018 – 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.

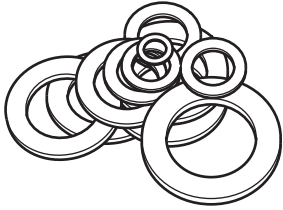
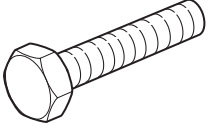
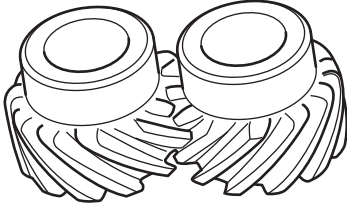
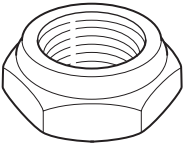
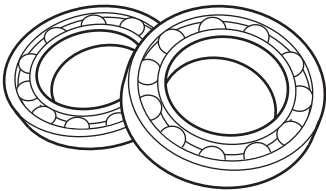
2

Answer **all** the questions.

1 The table below shows five standard components.

(a) (i) Complete the table by naming the standard components.

One has been done for you.

	Component image	Component name
1		
2		M8 Hex Head Bolt
3		
4		
5		

[4]

(ii) Name **one** other standard component.

..... [1]

3

(b) Give **two** reasons why designers would use standard components in the development of new products.

1.....

.....

2.....

.....

[2]

(c) Explain how standard components can improve the sustainability of new products.

.....

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..... [3]

2 Regulations and safeguards are an important consideration for designers and manufacturers.

(a) Give **two** reasons why regulations and safeguards are important when developing new products.

1.....
.....
2.....
.....

[2]

(b) (i) Draw the symbol for the 'European Conformity' mark below.

[1]

(ii) State **two** other examples of symbols that may be included on a product.

1.....
.....
2.....
.....

[2]

(c) State what is meant by the term 'registered' design.

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

(d) Explain the difference between a registered design and a patent.

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..... [3]

3 Fig. 1 shows an image of a USB cable plug.

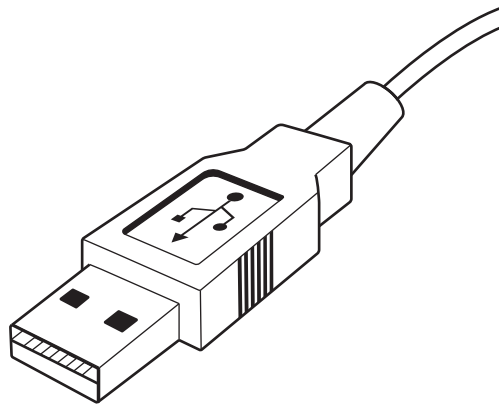


Fig. 1

(a) Explain how the USB plug has been designed with consideration of error proofing.

.....
.....
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..... [3]

(b) State which phase of the design cycle would include testing of a product.

..... [1]

(c) State **three** considerations that a designer could include in a manufacturing plan for a new product.

1.....
.....
2.....
.....
3.....
..... [3]

(d) Explain why designers may validate a design before final production commences.

.....

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..... [3]

4 The table below shows a range of different products and the material they are made from.

(a) Complete the table below by adding the most appropriate function:

Lightweight and strong

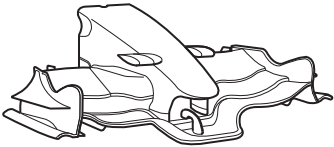
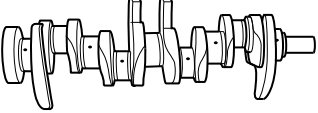
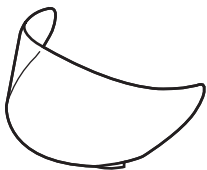
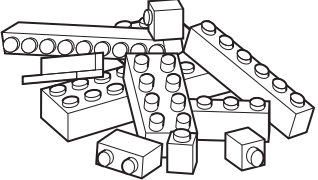

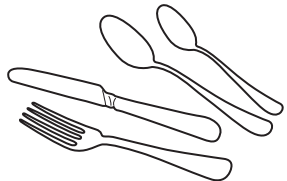
Non-toxic and easy to mould

Forged and hardened to resist wear

Impact resistant and transparent

Hygienic and resistant to corrosion

One has been done for you.

	Product	Material	Function
1	 <p>Formula 1 Front Wing</p>	Carbon fibre	
2	 <p>Engine Crankshaft</p>	Cast alloy steel	
3	 <p>Motorcycle Helmet Visor</p>	Polycarbonate	
4	 <p>Building Blocks</p>	ABS	
5	 <p>High-performance Bicycle Brake Lever</p>	Aluminium billet	Lightweight metal, easy to machine
6	 <p>Cutlery</p>	Stainless steel	

[5]

(b) State **two** reasons why manufacturers should consider the supply chain during the development of a new product.

1.....
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2.....
.....

[2]

(c) Explain why the availability of a material might have an impact on the design of a new product.

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[3]

5 The sustainability of new products is an important consideration for engineering designers.

(a) (i) Explain what is meant by the term 'sustainable design.'

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.....
..... [3]

(ii) Give **two** ways that designers can improve the sustainability of products.

1
.....
2
..... [2]

(b) State **two** environmental pressures that designers should consider when developing new products.

1
.....
2
..... [2]

(c) Explain how designers can ensure products do not contribute to environmental pressures.

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..... [3]

6 Scale of production can have an impact on the design of new products.

(a) (i) State **two** different scales of production.

1

.....

2

.....

[2]

(ii) Give **two** reasons why the scale of production should be considered during the design phase.

1

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2

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[2]

(b)* Discuss how the scale of production can have an impact on material selection.

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END OF QUESTION PAPER

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