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

R105 01

7301264938

Candidate forename		Candidate surname	

Centre number						Candidate number				

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

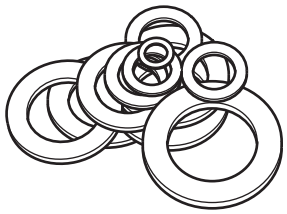
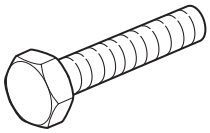
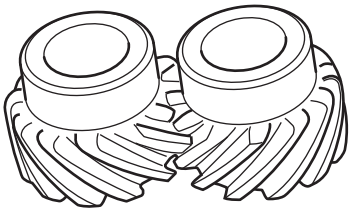
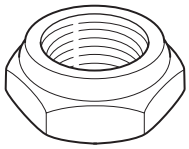
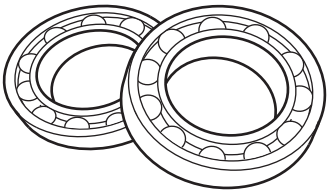
- The total number of marks for this paper is **60**.
- The number of marks for each question is given in brackets **[ ]** at the end of each question or part question.
- Dimensions are in millimetres unless stated otherwise.
- Your quality of written communication will be assessed in questions marked with an asterisk (*****).
- This document consists of **16** pages. Any blank pages are indicated.

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]**

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

1.....

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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.....

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2.....

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[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 .....

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2 .....

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[2]

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

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..... **[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.

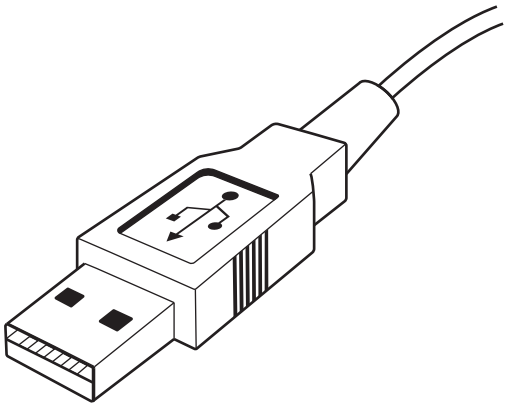

Fig. 1

(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.....

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2.....

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3.....

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[3]

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

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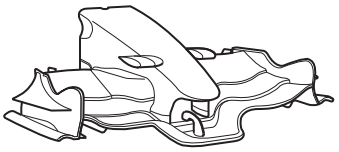
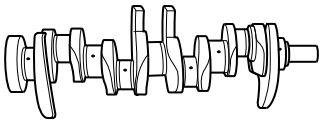
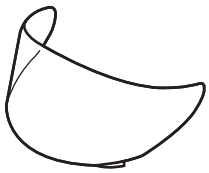
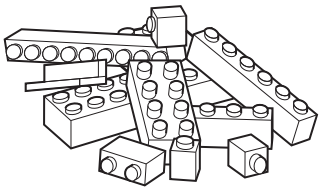
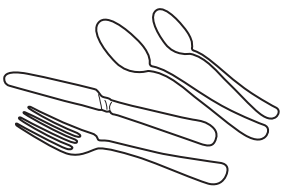
..... **[3]**

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
Forged and hardened to resist wear
Hygienic and resistant to corrosion
Non-toxic and easy to mould
Impact resistant and transparent

One has been done for you.

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

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[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 .....

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2 .....

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[2]

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

1.....

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2.....

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[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 .....

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2 .....

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[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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.... **[6]**

END OF QUESTION PAPER

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