



Oxford Cambridge and RSA

Friday 10 January 2020 – Morning

Level 1/2 Cambridge National Award/Certificate in Engineering Design

R105/01 Design briefs, design specifications and user requirements

Time allowed: 1 hour



No extra materials are needed.



Please write clearly in black ink. **Do not write in the barcodes.**

Centre number Candidate number

First name(s) _____

Last name _____

INSTRUCTIONS

- Use black ink. You can use an HB pencil but only for graphs and diagrams.
- Write your answer to each question in the space provided. You can use extra paper if you need to, but you must clearly show your candidate number, centre number and the question numbers.
- Answer **all** the questions.

INFORMATION

- The total mark for this paper is **60**.
- The marks for each question are shown in brackets [].
- Quality of written communication will be assessed in questions marked with an asterisk (*).
- This document has **8** pages.

ADVICE

- Read each question carefully before you start your answer.

Answer **all** the questions.

- 1 (a) Designers complete a range of tasks throughout the design cycle. The tasks are shown in the list below.

A	Test the product
B	Create a brief
C	Create a prototype
D	Develop a design specification
E	Evaluate the design

Put the tasks in the correct order. One has been completed for you.

				E
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[4]

- (b) Designers will also complete research to inform the design of new products.

State **three** ways a designer can undertake research.

- 1
- 2
- 3

[3]

- (c) Explain why further research may be required later in the design process.

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[3]

2 Fig. 1 shows a portable speaker.

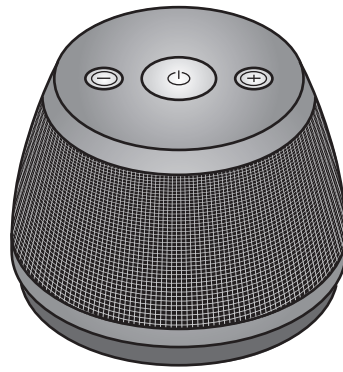


Fig. 1

(a) Describe a product requirement for each of the following areas that should be included in a design specification for the portable speaker.

(i) working environment

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

(ii) ergonomics

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

(iii) lifecycle

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

(b) Give **one** other product requirement that should be included in a design specification.

..... [1]

(c) Describe how a design specification is used to ensure the product can be successfully manufactured.

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

4 Scale of production is an important manufacturing consideration.

(a) Name **one** production process that would be suitable for each scale of production.

(i) one-off

..... [1]

(ii) mass

..... [1]

(b) Suggest **one** product that would be manufactured in each scale of production.

(i) one-off

..... [1]

(ii) batch

..... [1]

(iii) mass

..... [1]

(c) State **one** reason why manufacturing plans should consider the scale of production early in the design cycle.

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

(d) Explain why processes used for mass production may not be suitable for producing a one-off product.

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.....
.....
..... [4]

5 New and emerging materials can improve product performance.

(a) Name **three** new and emerging materials.

- 1
- 2
- 3 **[3]**

(b) Describe, using an example product, how a new and emerging material has improved the performance of a product.

Example product

Description

.....

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

(c) Give **two** ways that production costs can be affected by material selection.

- 1
-
- 2
- **[2]**

(d) Name **two** other factors that can affect production costs.

- 1
- 2 **[2]**

6 Fig. 2 shows a disposable cup and plastic drinking straw.

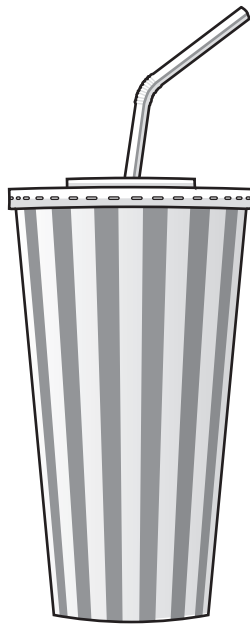


Fig. 2

(a) (i) State **two** environmental pressures that are affected by the products in Fig. 2.

- 1
- 2 [2]

(ii) Suggest **two** design changes that could be made to reduce the effect of the disposable cup and plastic drinking straw on the environment.

- 1
-
- 2
- [2]

(iii) Give **two** performance requirements that the disposable cup and plastic drinking straw must still meet following the design changes.

- 1
-
- 2
- [2]

