Modified Enlarged 24pt

OXFORD CAMBRIDGE AND RSA EXAMINATIONS

Wednesday 22 May 2019 – Morning

LEVEL 1/2 CAMBRIDGE NATIONAL AWARD/CERTIFICATE IN ENGINEERING DESIGN

R105/01 Design briefs, design specifications and user requirements

Time allowed: 1 hour
plus your additional time allowance

Candidates answer on the Question Paper.

OCR SUPPLIED MATERIALS:
None

OTHER MATERIALS REQUIRED:
None

Please write clearly in black ink.

Centre number | | | | | |

Candidate number | | | | |

First name(s) _____

Last name _____

READ INSTRUCTIONS OVERLEAF

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INSTRUCTIONS

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

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

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 FIG. 1 shows an example of a smart watch.

FIG. 1

(a) Shown below are five requirements that inform the purpose of the product.

Join each of these requirements with the correct product feature.

One has been done for you. [4]

Purpose of the product	Suggested product feature
Be a wearable message receiver	Digital clock
Act as a fitness monitor	Heart rate sensor
Be an accurate time piece	NFC chip
Be a personal navigation assistant	Cellular data
Process contactless payments	GPS technology

(b) **State THREE pieces of information that designers could gather to help define the purpose of a product.**

1 _____

_____

2 _____

_____

3 _____

_____

[3]

(c) **Explain why it is important for designers to define the purpose of a product before commencing the design.**

_____

_____

_____

_____

_____

_____ **[3]**

2 FIG. 2 shows a travel case.

FIG. 2

(a) State how each of the following limitations and constraints have impacted on the design of the travel case.

(i) Weight

_____

_____ [2]

(ii) Size

_____

_____ [2]

(iii) Ergonomics

_____

_____ [2]

(b) Give ONE way the designer could change the 'aesthetics' of the travel case.

_____ [1]

(c) Explain how the designer has considered the working environment in the design of the travel case.

_____

_____

_____

_____

_____

_____ [3]

3 Product safety is a critical consideration for designers when developing new products.

(a) Draw TWO symbols from the list below that could be included on a product. Use the space opposite.

British Toy and Hobby Association Lion Mark

Age restriction logo

CE mark

Highly Flammable [2]

Symbol 1	
Symbol 2	

(b) **Give TWO reasons why product safety is an important consideration for designers.**

1 _____

_____

2 _____

_____

[2]

(c)* Discuss the difference between market pull and technological push.

[6]

4 The table below contains various points that would be included in a design specification.

(a) Complete the table by adding FOUR other points that could be included in a design specification. [4]

1	Aesthetics
2	Ergonomics
3	
4	Limitations and constraints, size, weight, functional limitations
5	
6	Product safety
7	
8	Maintenance
9	
10	British Standards

(b) Explain why a designer must define a design specification before manufacturing a design.

_____

_____

_____

_____ [3]

(c) State THREE areas that would be considered during a Life Cycle Analysis (LCA).

1 _____

_____

2 _____

_____

3 _____

_____

[3]

5 Process planning is an important part of the development of new products.

(a) (i) State which phase of the design cycle includes process planning.

_____ **[1]**

(ii) Give TWO reasons why designers would carry out process planning during this stage of the design cycle.

1 _____

_____

2 _____

_____

[2]

(b) The situation and context are important factors when developing a design brief.

State the meaning of the following terms when considering the development of a design brief.

(i) Situation

_____

_____ [2]

(ii) Context

_____

_____ [2]

(c) **Describe how designers may use inspirational and iconic products to inform the development of a new design.**

_____

_____

_____

_____ **[3]**

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6 FIG. 3 shows a vacuum cleaner.

FIG. 3

(a) State THREE ways that the vacuum cleaner in FIG. 3 could be designed for maintenance.

1 _____

_____

2 _____

_____

3 _____

_____

[3]

(b) **Explain how maintenance can contribute to sustainable design.**

_____

_____

_____

_____ **[3]**

(c) New production processes can impact on the design of new products.

(i) Give ONE example of a new production process.

_____ [1]

(ii) Give THREE advantages of the new production process in your example given to part (i).

1 _____

_____

2 _____

_____

3 _____

_____

[3]

END OF QUESTION PAPER

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