Modified Enlarged 24pt

OXFORD CAMBRIDGE AND RSA EXAMINATIONS

Tuesday 11 January 2022 – Morning

Level 1/2 Cambridge National in Engineering Design

R105/01 Design briefs, design specifications and user requirements

Time allowed: 1 hour plus your additional time allowance

No extra materials are needed.

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. 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, the 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 (*).

ADVICE

Read each question carefully before you start your answer.

Answer ALL the questions.

1 (a) The 6R's are an important element of sustainable design. Complete the table below by adding the missing parts of the 6R's. [3]

1	
2	Reuse
3	
4	Refuse
5	
6	Rethink

(b) Describe what is meant by the following parts of the 6R's.

(i) Refuse

_____

_____

_____ [2]

(ii) Rethink

_____

_____

_____ [2]

(c) **Describe the impact of non-recyclable materials on the environment.**

_____

_____

_____

_____

_____

_____ **[3]**

2 FIG. 1 shows a mass-produced bucket produced using injection moulding.

FIG. 1

(a) (i) Give ONE way that ease of manufacturing has been considered in the design of the bucket shown in FIG. 1.

_____ **[1]**

(ii) Give TWO benefits, other than ease of manufacturing, when using injection moulding.

1 _____

2 _____

[2]

(iii) **Name THREE manufacturing processes, other than injection moulding, suitable for mass production.**

1 _____

2 _____

3 _____

[3]

(b) **Explain why manufacturing processes can have an impact on the design of products.**

_____

_____

_____

_____

_____

_____

_____

_____ **[4]**

3 As part of the design cycle, designers need to consider the impact a new product will have during its manufacture and useable life.

(a) Name THREE areas of sustainable design that would be considered when evaluating a new product.

1 _____

2 _____

3 _____

[3]

(b) Name TWO processes, other than evaluation, that occur in the validate phase of the design cycle.

1 _____

2 _____

[2]

(c) **Name ONE other phase of the design cycle.**

_____ **[1]**

(d) **Explain the importance of evaluating a product before sale.**

_____

_____

_____

_____

_____

_____ **[4]**

4 Pre-manufactured components can be used during the manufacture of products.

(a) Give TWO reasons why designers may use pre-manufactured components.

1 _____

2 _____

[2]

(b) (i) Give TWO advantages of using prototyping during the development of a new product.

1 _____

2 _____

[2]

(ii) Name TWO types of additive manufacturing technology that could be used for producing a prototype.

1 _____

2 _____

[2]

(c) Explain why designers should consider the supply chain when developing a new product.

_____

_____

_____

_____

_____

_____ [4]

5 Product testing is an important part of developing a new product.

(a) Give ONE method that can be used for each type of product testing.

Virtual

_____

Physical

_____

[2]

(b) Give TWO reasons why designers would suggest ways to improve the design during the validation phase.

1 _____

2 _____

[2]

(c)* Discuss, using examples, how error proofing is used in the design of products. [6]

6 Below are two product symbols.

SYMBOL A

SYMBOL B

(a) Name the symbols.

Symbol A

_____

Symbol B

_____

[2]

(b) (i) Draw the trademark symbol below.

[1]

(ii) Name ONE other symbol used to safeguard a design or a product.

_____ [1]

(c) Give TWO OTHER reasons why symbols are applied to products.

1 _____

2 _____

[2]

(d) FIG. 2 shows a symbol found on products.

FIG. 2

(i) State the name of the symbol in FIG. 2.

_____ [1]

(ii) Explain the purpose of the symbol in FIG. 2.

_____

_____

_____

_____

_____

_____

_____

_____ [3]

END OF QUESTION PAPER

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