Modified Enlarged 18pt

OXFORD CAMBRIDGE AND RSA EXAMINATIONS

Monday 9 January 2023 – 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 The design cycle consists of FOUR phases:

Design phase **Identify phase**

Optimise phase **Validate phase**

(a) Complete the table below by:

(i) Putting the design cycle phases in the correct order.

(ii) State ONE activity that takes place in each phase.

One of each has been completed for you. [6]

Order	Design Cycle Phase	Activity
1st		
2nd	Design phase	Development of a range of design ideas.
3rd		
4th		

Error proofing is an important part of design and manufacture.

FIG. 1 shows a 3 pin plug and socket.

FIG. 1

(b) (i) State how error proofing is used in the design of the 3 pin plug and socket shown in FIG. 1.

_____

_____ **[1]**

(ii) State why error proofing is used in manufacturing.

_____

_____ **[1]**

(iii) **Explain why error proofing is important to the user.**

_____

_____

_____

_____ **[2]**

2 (a) When presenting a design brief, state what is meant by the following terms:

(i) Client

_____

_____ [1]

(ii) Designer

_____

_____ [1]

(b) (i) Give TWO reasons why corporate branding is important.

1 _____

2 _____

[2]

(ii) State TWO ways corporate branding can be shown on a product.

1 _____

2 _____

[2]

(c) State TWO ways a focus group can help to inform market research.

1 _____

2 _____

[2]

(d) Describe what is meant by the term 'consumer trends'.

_____

_____

_____

_____ **[2]**

3 Products can be upcycled at the end of their life.

(a) Describe how a product can be upcycled.

_____

_____

_____

_____ **[2]**

(b) Name TWO other processes that avoid the disposal of products at the end of their life.

1 _____

2 _____

[2]

(c) State TWO benefits of using eco-friendly materials.

1 _____

2 _____

[2]

(d) **Explain the effects that extraction of non-renewable materials has on the environment.**

_____

_____

_____

_____

_____

_____

_____

_____ **[4]**

4 (a) Give the meaning of the term 'ergonomics'.

_____

_____

_____

_____ **[2]**

FIG. 2 shows a toothbrush.

FIG. 2

(b) State TWO ergonomic features considered in the design of the toothbrush shown in FIG. 2.

1 _____

2 _____

[2]

FIG. 3 shows a dining chair.

Ergonomic design and anthropometric data were used in the design of the dining chair.

FIG. 3

(c) Explain why ergonomic design is important when designing the dining chair shown in FIG. 3.

_____

_____

_____

_____

_____

_____ **[3]**

(d) **Explain, using an example, how anthropometrics are used in the design of the dining chair.**

_____

_____

_____

_____

_____

_____ **[3]**

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5 (a) State the meaning of each of the terms below, which are used in product requirements.

(i) Durability _____

_____ [1]

(ii) Reliability _____

_____ [1]

(b) Explain why it is important to check material availability prior to commencing production.

_____

_____

_____

_____ [2]

(c)* Discuss how scale of production affects production costs. [6]

_____

_____

_____

_____

_____

6 **FIG. 4 shows a robot arm used in manufacturing and assembly.**

FIG. 4

(a) (i) **State TWO ADVANTAGES of using robots in manufacturing and assembly.**

1 _____

_____

2 _____

_____

[2]

(ii) **State TWO DISADVANTAGES of using robots in manufacturing and assembly.**

1 _____

_____

2 _____

_____

[2]

(b) **Give TWO reasons why pre-manufactured components may be used in the manufacture of products.**

1 _____

_____

2 _____

_____

[2]

(c) (i) **Explain what is meant by the term 'cloud computing'.**

_____

_____

_____

_____ **[2]**

(ii) **State TWO advantages of using cloud computing.**

1 _____

_____

2 _____

_____

[2]

END OF QUESTION PAPER

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