



Oxford Cambridge and RSA

**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**



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, 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 (\*).
- This document has **8** pages.

**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.

1	
2	Reuse
3	
4	Refuse
5	
6	Rethink

[3]

- (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.

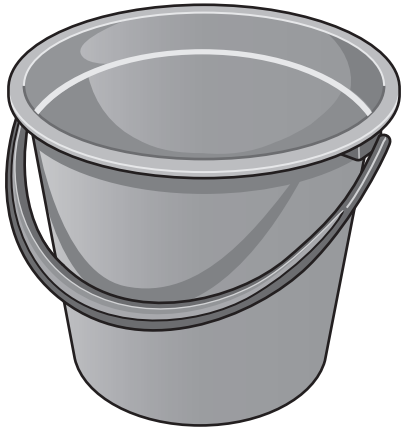


Fig. 1

(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.

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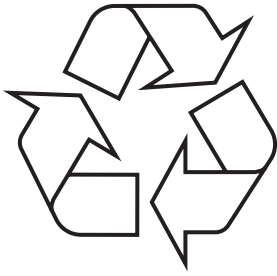
.....

.....

.....

..... [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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