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**Friday 9 January 2015 – Morning****LEVEL 1/2 CAMBRIDGE NATIONAL AWARD/  
CERTIFICATE IN ENGINEERING DESIGN****R105/01** Design briefs, design specification and user requirements

Candidates answer on the Question Paper.

**OCR supplied materials:**

None

**Other materials required:**

None

**Duration:** 1 hour

|                       |  |                      |  |
|-----------------------|--|----------------------|--|
| Candidate<br>forename |  | Candidate<br>surname |  |
|-----------------------|--|----------------------|--|

|               |  |  |  |  |  |                  |  |  |  |  |
|---------------|--|--|--|--|--|------------------|--|--|--|--|
| Centre number |  |  |  |  |  | Candidate number |  |  |  |  |
|---------------|--|--|--|--|--|------------------|--|--|--|--|

**INSTRUCTIONS TO CANDIDATES**

- Use black ink. HB pencil may be used for graphs and diagrams only.
- Complete the boxes above with your name, centre number and candidate number.
- Answer **all** the questions.
- Write your answer to each question in the space provided.
- Do **not** write in bar codes.

**INFORMATION FOR CANDIDATES**

- 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(\*)
- This document consists of **16** pages. Any blank pages are indicated.

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Answer **all** the questions.

- 1 A coffee shop wants to introduce smoothies to sell in their product line. Fig. 1 shows an example of a smoothie maker.



Fig. 1

- (a) Shown below are five client requirements.

Join each client requirement to the correct suggested product feature.

One has been done for you.

#### Client requirement

Must be easy to clean safely

Must be able to pour smoothie into glass

Must remain stationary when working

Must be easy to use by all employees

Must not allow user to touch blades when switched on

#### Suggested product feature

Silicone feet pads

Large on/off switch

Interlocking lid cut-out

Detachable jug

Removable blade

[4]

(b) Describe why hygiene is an important requirement of the coffee shop's client brief.

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

(c) A survey may be conducted as part of market research to update the design of the smoothie maker shown in Fig. 1.

Describe **one** improvement that may come from a feature identified in the survey.

Feature: .....

Improvement: .....

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

(d) Give **two** reasons why a final design brief could be different from the initial client brief.

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

2 Fig. 2 shows a modern multi gym.



Fig. 2

(a) Give **four** ways in which the design of the multi gym could ensure that it is suitable for a wide range of users.

- 1 .....
- 2 .....
- 3 .....
- 4 .....

[4]

(b) Describe **one** benefit to the manufacturer of making the multi gym suitable for a range of users.

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

(c) Describe the following two phases of the product design cycle.

(i) Identify

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

(ii) Design

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

3 Fig. 3 shows an electric fan heater.

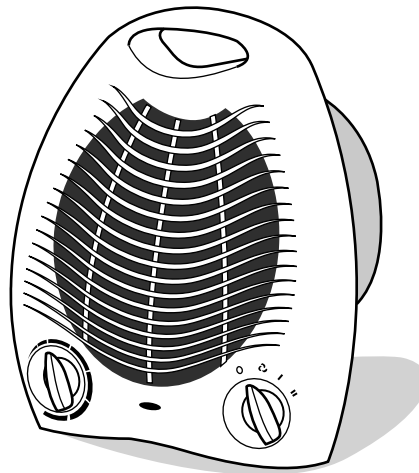


Fig. 3

(a) Describe how **each** of the following could influence the design of an electric fan heater.

(i) appearance

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

(ii) ergonomics

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

(iii) life cycle

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

(b) Give **two** reasons why it would be important that the internal heating element is both thermally and electrically insulated from the outer body of the electric fan heater.

1 .....

.....

2 .....

.....

[2]

(c) Give **two** performance requirements for an electric fan heater.

1 .....

.....

2 .....

.....

[2]

4 Fig. 4 shows a snap together casing for a small electronic product.

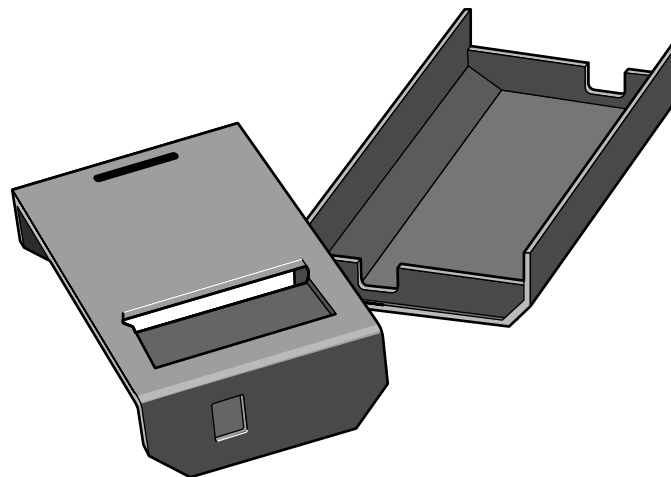


Fig. 4

(a) Give **one** reason, other than ease of assembly, why snap together casings are used in modern plastic products.

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

(b) Describe why designers consider the ease of assembly when designing products.

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

(c) Explain why many modern products are designed for easy disassembly.

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



(d) Explain why product parts that were traditionally made of metal are now often made of plastics.

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

(e) Explain the cost advantages and disadvantages of moving from batch to high-volume production.

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

5 Fig. 5 shows some common standard components.

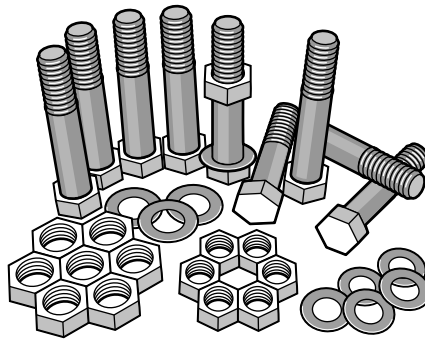


Fig. 5

(a) Give **two** benefits to a manufacturer of using standard components in their range of products.

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

(b) Describe why standard components are manufactured to certain tolerances.

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

(c) Give **one** example of each of the following materials and explain how they can benefit the design and use of a product:

- modern materials
- sustainable materials

modern materials

.....

.....

.....

.....

.....

.....

..... [3]

sustainable materials

.....

.....

.....

.....

.....

.....

..... [3]

6 (a) The symbols shown below are often seen on labelling of products.

Give **one** reason why each symbol would be important for a consumer.



.....

.....



.....

.....

[2]

(b) Familiar iconic products, such as the Mini Cooper and Lego are often modernised and updated by designers.

Give **two** reasons why designers choose to base new ideas on previously successful products.

1 .....

.....

2 .....

.....

[2]



14

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