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Wednesday 11 January 2017 – Morning**LEVEL 1/2 CAMBRIDGE NATIONAL AWARD/
CERTIFICATE IN ENGINEERING DESIGN****R105/01** Design briefs, design specifications and user requirements

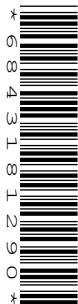
Candidates answer on the Question Paper.

OCR supplied materials:

None

Other materials required:

None

Duration: 1 hour

Candidate forename		Candidate surname	
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Centre number						Candidate number				
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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. Additional paper may be used if necessary but you must clearly show your candidate number, centre number and question number(s).
- Do **not** write in the 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.

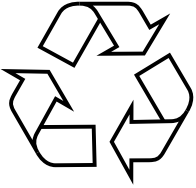




Answer **all** the questions.

1 Legislation and safety are important considerations when designing new products.

(a) (i) The table below shows a range of signs and symbols commonly seen on products.

Complete the table by stating what each symbol indicates.

One has been done for you.

	Symbol	The symbol indicates:
1		
2		That products have been tested and are deemed safe to use.
3		
4		
5		

[4]

(ii) Give **one** reason, other than safety, why signs and symbols are applied to products.

.....
 [1]

3

(b) State **two** ways designers can make sure products are safe to use.

1

.....

2.....

.....

[2]

(c) Explain why it is important for manufacturers to make sure products are safe before being put on sale.

.....

.....

.....

.....

.....

.....

[3]

2 Fig. 1 shows a motor assembly.

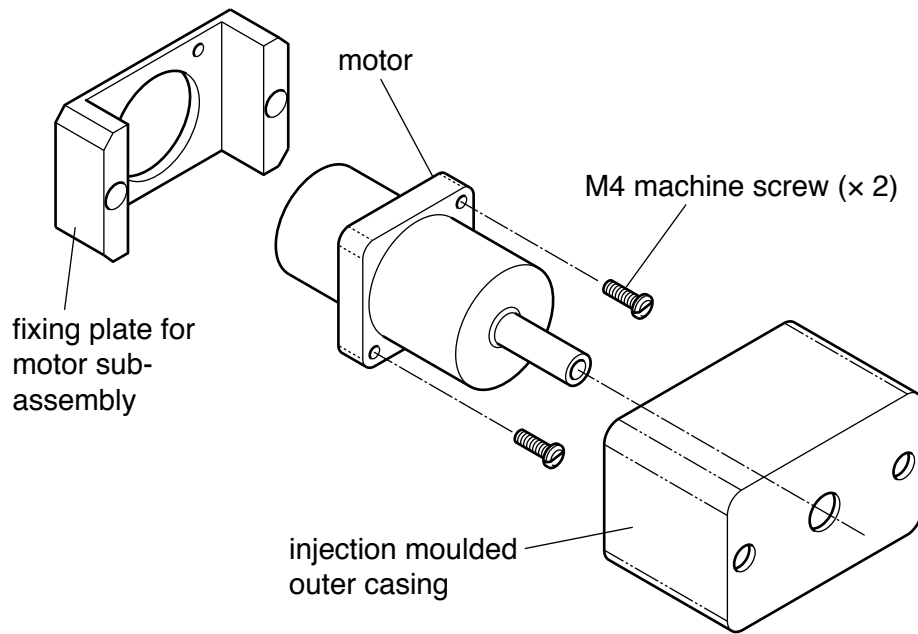


Fig. 1

(a) (i) Give **two** ways that the designer has considered design for manufacturing assembly (DFMA) in the motor's design.

- 1
-
- 2
-

[2]

(ii) Explain what is meant by the term design for manufacturing assembly (DFMA).

-
-
-
-
-
-
-

[3]

(b) State **two** ways that products can be designed for disassembly.

1

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2

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[2]

(c) Explain why design for disassembly is an important consideration when designing new products.

.....

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.....

.....

[3]

3 Many new products are developed based on market pull and technological push.

(a) Define what is meant by the terms 'market pull' and 'technological push'.

(i) Market pull

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

(ii) Technological push

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

(b) State **two** factors that can create market pull.

1
.....
2
..... [2]

(c) Give **two** methods a designer could use to identify the needs of the market.

1
.....
2
..... [2]

4 Fig. 2 shows a bicycle.

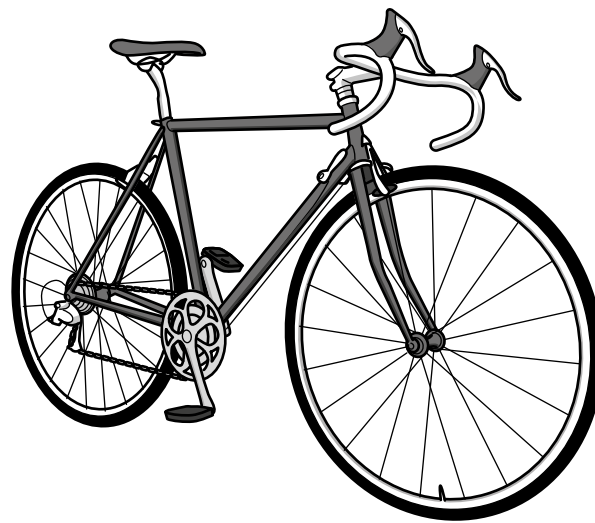


Fig. 2

(a) (i) Anthropometrics is an important area of consideration when designing products.

State what is meant by the term anthropometrics.

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

(ii) State **two** anthropometric considerations for the design of the bicycle.

1
.....
2
..... [2]

(b) Describe how the bicycle design could be influenced by ergonomics.

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

(c) New and emerging materials are a critical part of bicycle design.

Give **two** ways that new materials can improve bicycle design.

1

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2

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[2]

(d) Explain how new production processes may impact on the design of a new product.

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[3]

10

5 Fig. 3 shows a plastic ice cube tray.

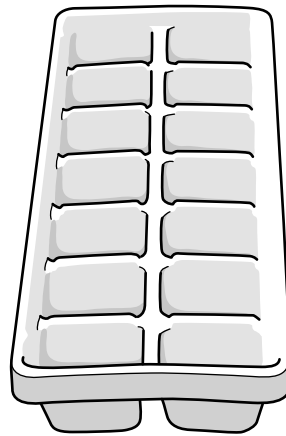


Fig. 3

(a) Testing takes place during the validate phase of the design cycle.

(i) State **two** ways that a designer could test the ice cube tray.

1

2

[2]

(ii) Explain why testing is important when developing a new product.

.....
.....
.....
.....
.....

[3]

(b) Error proofing is part of the optimise phase of the design cycle.

(i) Give **two** ways that designers can incorporate error proofing into designs for new products.

1

2

[2]

(ii) Explain the impact error proofing has on the operation of new products.

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

6 Fig. 4 shows an engineering drawing of a component.

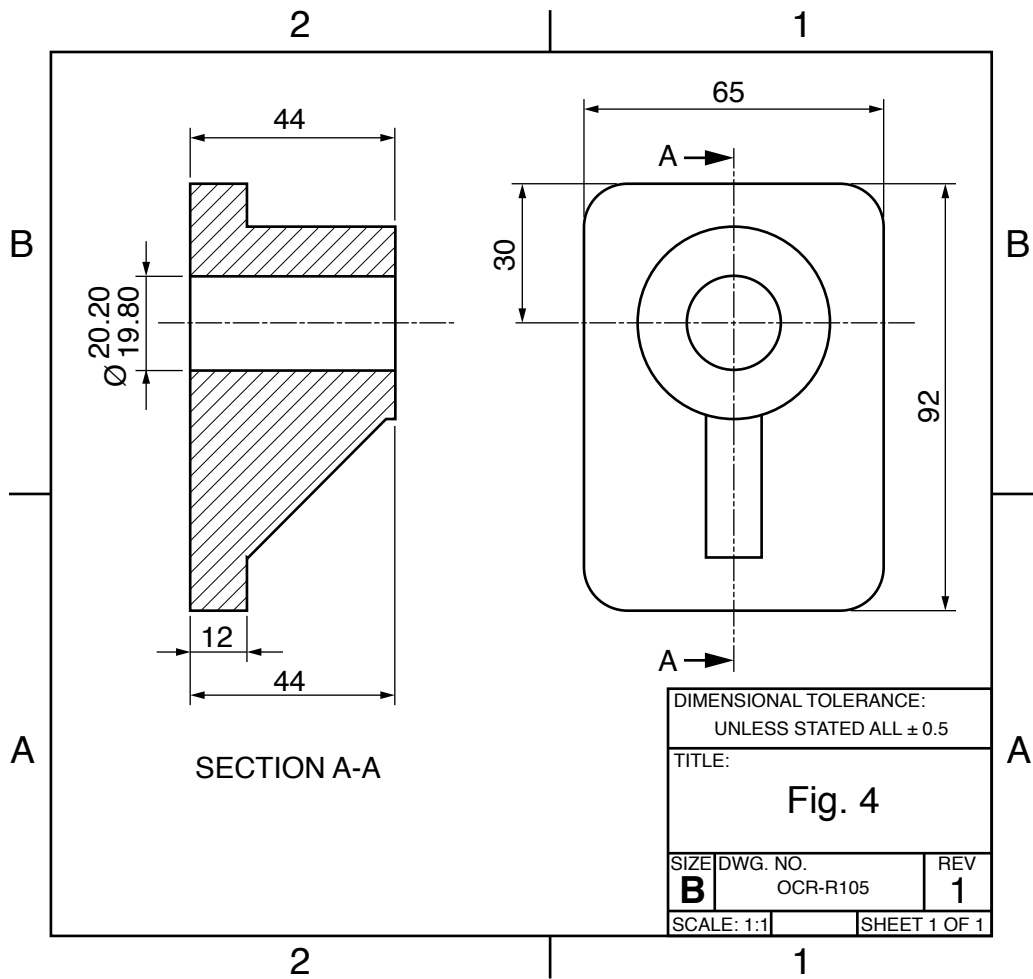


Fig. 4

- (a) (i) Label the drawing in Fig. 4 to identify where a specific tolerance is shown. [1]
- (ii) Explain why engineering drawings may have general and specific tolerances.

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..... [3]

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