

Write your name here

Surname

Other names

Centre Number

Candidate Number

**Edexcel GCE**

**Design and Technology**  
**Product Design: Resistant Materials Technology**  
**Advanced**  
**Unit 3: Designing for the Future**

Tuesday 4 June 2013 – Morning

**Time: 2 hours**

Paper Reference

**6RM03/01**

**You do not need any other materials.**

Total Marks

### Instructions

- Use **black** ink or ball-point pen.
- If pencil is used for diagrams/sketches it must be dark (HB or B). Coloured pens, pencils and highlighter pens must not be used.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided  
– *there may be more space than you need.*

### Information

- The total mark for this paper is 70.
- The marks for **each** question are shown in brackets  
– *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (\*) are ones where the quality of your written communication will be assessed  
– *you should take particular care on these questions with your spelling, punctuation and grammar, as well as the clarity of expression.*

### Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

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**PEARSON**

**Answer ALL the questions. Write your answers in the spaces provided.**

**1** The advancement of information and communication technology (ICT) has brought many advantages to both manufacturers and consumers.

(a) Give **four** advantages to the manufacturer of internet marketing.

(4)

1 .....

2 .....

3 .....

4 .....



(b) Explain **three** advantages to the manufacturer of using a quick response manufacturing (QRM) strategy.

(6)

1 .....

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2 .....

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3 .....

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**(Total for Question 1 = 10 marks)**



2 The properties of polymers or plastics can be altered by mixing them with other materials.

(a) Describe how the properties of polymers are improved by the addition of the following additives:

- Plasticisers
- Stabilisers
- Fillers

(i) Plasticisers

(2)

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(ii) Stabilisers

(2)

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(iii) Fillers

(2)

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(b) Explain **two** reasons why it is important to produce materials that are recyclable.

(4)

1 .....

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2 .....

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**(Total for Question 2 = 10 marks)**



**3** Computer-aided quality (CAQ) control is an important part of computer-integrated manufacture (CIM).

(a) Give **five** advantages of using computer-aided quality control.

(5)

1 .....

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2 .....

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3 .....

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4 .....

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5 .....

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(b) Give **five** disadvantages of using robots on a fully automated production and assembly line.

(5)

1 .....

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5 .....

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**(Total for Question 3 = 10 marks)**



4 Ergonomics is an important consideration when designing a product for human interaction.

Figures 1 and 2 show exercise dumbbells.



**Traditional design**

**Figure 1**



**Philippe Starck design**

**Figure 2**

(a) Discuss how ergonomics has been considered in the design of these dumbbells.

(4)

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(b) Form and function are connected in the design of most products.

Figure 3 shows an adjustable back lounge chair designed by William Morris.



**Figure 3**







5 Products are often designed with built-in obsolescence.

(a) Explain **two** advantages to the manufacturer of built-in obsolescence.

(4)

1 .....

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2 .....

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(b) Explain **one** advantage to the consumer of built-in obsolescence.

(2)

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(c) The development of smart materials has allowed designers to become more innovative in their use of materials.

Figure 4 shows a light which changes shape when switched on.



**Figure 4**

Explain **three** applications where smart materials have been used in an innovative way.

(6)

1 .....

2 .....

3 .....

**(Total for Question 5 = 12 marks)**







\*7 Minimising waste production is an important factor in the design of any product.

Figure 5 shows an electric toothbrush.



**Figure 5**

Describe ways in which waste could be minimised in the design and production of electric toothbrushes.

**(8)**

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Lined writing area for the answer to Question 7.

**(Total for Question 7 = 8 marks)**

**TOTAL FOR PAPER = 70 MARKS**





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