

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**

Wednesday 13 June 2012 – Afternoon

**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 Figure 1 shows a laminated wooden bridge.



Figure 1

(a) Give **three** advantages lamination has compared to solid timber for the construction of the arches of the bridge.

(3)

1 .....

2 .....

3 .....



(b) Describe, using notes and/or sketches, how a laminated arch would be manufactured.

(3)

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(c) Biotechnology is used to alter the properties of timber.

Explain **two** ways in which the genetic modification of timber can be used to improve its properties.

(4)

1 .....

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2 .....

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



2 Electronic communication is widely used to increase efficiency.

(a) Give **two** ways in which electronic point of sale (EPOS) can be used to increase efficiency.

(2)

1 .....

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2 .....

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(b) Assess the use of automated stock control as a key element of just in time (JIT) manufacturing.

(6)

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**(Total for Question 2 = 8 marks)**



3 Figure 2 shows an alloy wheel which has been machined using computer aided manufacture (CAM).



**Figure 2**

(a) Give **four** reasons why a manufacturer might choose computer aided manufacturing (CAM) for the production of the wheel.

(4)

1 .....

2 .....

3 .....

4 .....



(b) Explain **three** reasons why a manufacturer might choose a concurrent manufacturing strategy.

(6)

1 .....

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2 .....

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3 .....

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



4 Figures 3 and 4 show computer keyboards. The keyboard in Figure 3 has been designed to be more ergonomic than the more traditional computer keyboard shown in Figure 4.



**Figure 3**



**Figure 4**

(a) Outline what is meant by 'ergonomic design'.

(4)

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(b) Explain **two** advantages of the keyboard shown in Figure 3 over the more traditional keyboard shown in Figure 4.

(4)

1 .....

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2 .....

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(c) Explain **two** disadvantages of the ergonomic keyboard over a more traditional one.

(4)

1 .....

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2 .....

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**(Total for Question 4 = 12 marks)**

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5 Designers should consider the life cycle of a product when designing.

Figure 5 shows a printer ink cartridge.



**Figure 5**

(a) Discuss how the designer of the printer ink cartridge might have considered sustainability in the following:

- materials
- distribution

(i) Materials

**(4)**

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(ii) Distribution

(3)

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(b) Advances in technology have allowed for the miniaturisation of products.

Figure 6 shows a hand held music player.



**Figure 6**

Give **three** advantages of miniaturisation.

(3)

1 .....

2 .....

3 .....

(c) Give **two** disadvantages of miniaturisation.

(2)

1 .....

2 .....

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



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\*6 Renewable sources of energy are an important consideration for sustainable living.

Figure 7 shows a wind farm.



**Figure 7**

Evaluate the use of wind generated electricity as an alternative to fossil fuelled power stations.

(10)

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Lined writing area for Question 6.

**(Total for Question 6 = 10 marks)**



\*7 Discuss the effects robot technology has had on manufacturing.

(8)

A series of horizontal dotted lines for writing the answer to the question.





(Total for Question 7 = 8 marks)

**TOTAL FOR PAPER = 70 MARKS**



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