



General Certificate of Education
Advanced Level Examination
June 2012

Design and Technology: Product Design (3-D Design)

PROD3

Unit 3 Design and Manufacture

Wednesday 13 June 2012 1.30 pm to 3.30 pm

For this paper you must have:

- an AQA 12-page unlined answer book
- normal writing and drawing instruments
- an Insert Sheet (enclosed).

Time allowed

- 2 hours

Instructions

- Use black ink or black ball-point pen. Use pencil and coloured pencils only for drawing.
- Write the information required on the front of your answer book. The **Examining Body** for this paper is AQA. The **Paper Reference** is PROD3.
- Answer **three** questions.
- Answer **one** question from each of Sections 1 and 2 and **one** other question from either section.
- If you choose to answer a question which has several parts, you should answer **all** parts of this question.
- Do all rough work in your answer book. Cross through any work you do not want to be marked.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 84.
- You will be marked on your ability to:
 - use good English
 - organise information clearly
 - use specialist vocabulary where appropriate.

Advice

- Illustrate your answers with sketches and/or diagrams wherever you feel it is appropriate.

Answer **three** questions.

Answer **one** question from each of Sections 1 and 2 and **one** other question from either Section.
For each question that you answer, you should answer all parts of that question.

Section 1

Question 1 Answer all parts of this question.

0	1
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Describe simple workshop tests which could be carried out to a range of materials in order to investigate **two** of the mechanical properties from the list below.

- Hardness
- Tensile strength
- Toughness
- Ductility and malleability

(2 x 6 marks)

0	2
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Sometimes it is necessary to combine two or more materials in order that the enhanced properties can be utilised.

For **two** of the following, name a specific composite material, stating its constituent parts.

In each case explain why the composite material is suitable for a specific application.

- Fibre-reinforced composite
- Particle-based composite
- Sheet-based composite

(2 x 8 marks)

Question 2

0	3
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On the Insert Sheet **Figures 1 and 2** show a traditional metal colander and **Figures 3 and 4** show a modern polymer colander. These colanders are used for washing vegetables, etc.

Compare and contrast these two colanders. You should make reference to the use of materials and how these have affected:

- the method of manufacture
- the function and use of the product.

(28 marks)

Question 3

0	4
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The selection of materials and processes for the manufacture of products varies according to the quantity of the product required.

For **two** of the following scales of production explain what materials **and** processes could have been used in the manufacture of a product you have named.

- One-off production
- Batch production of 100 units
- Mass production of 10 000 units

(2 x 14 marks)

Turn over for Section 2

Turn over ▶

Section 2

Question 4 Answer all parts of this question.

0 5 'Between two objects equal in function and cost, the more beautiful sells'

The above statement was Raymond Loewy's definition of good design.

With reference to a range of specific products explain how aesthetics have played an important part in their success. (12 marks)

0 6 For a specific product of your choice describe how the application of new technology and modern materials has improved its manufacture, function and use. (16 marks)

Question 5 Answer all parts of this question.

0 7 **Figures 5–7** on the Insert Sheet show examples of street furniture.

Explain the main criteria that you believe should be used in the design of such items. (8 marks)

0 8 Using the criteria you have given in part [07] critically evaluate the design of the bench shown in **Figures 5–6** and the bin shown in **Figure 7**. (20 marks)

Question 6

0 9 With reference to **two different** products explain how product development and design innovation have ensured success for the manufacturer.

In your answer you should refer to

- technology push
- market pull
- planned obsolescence
- the influence of trends and fashion.

(2 x 14 marks)

END OF QUESTIONS