

# **X211/301**

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NATIONAL  
QUALIFICATIONS  
2009

FRIDAY, 22 MAY  
1.00 PM – 3.00 PM

PRODUCT DESIGN  
HIGHER

70 marks are allocated to this paper.



Attempt ALL questions.

SECTION A

1. Two condiment sets are shown below.



Condiment Set A

**Condiment Set A**

Price: £24.95

**Material:** Beech, also available in walnut.

**Description:** The manual twist mechanism for the pepper mill is crafted from solid, cutlery grade stainless steel to withstand the rigors of commercial use.

The pepper mill is constructed with an internal spring tension system which allows it to be adjusted to mill very fine to coarse pepper.



Condiment Set B

**Condiment Set B**

Price: £55.00

**Material:** Stainless steel with brushed finish.

**Description:** Designed for cooks who love gadgets. With a twist of the wrist, the electric mills lock into 6 pepper and 3 salt grind adjustments.

The pepper mill features an original Peugeot case-hardened steel milling mechanism, while the salt mill contains a stainless steel mechanism that will not corrode from the salt. The acrylic section allows easy viewing of contents. A touch of a button activates the mill and its illuminating lamplight. Each use six AAA batteries.

1. (continued)

- |   |   |
|---|---|
| (a) Outline a product specification for <b>one</b> of the condiment sets in relation to its intended target market.                 | 6 |
| (b) Justify the choice of materials used to produce <b>both</b> condiment sets.   | 6 |
| (c) Describe <b>and</b> justify production methods that would be suitable to manufacture the component parts of the condiment sets. | 6 |
| (d) With reference to the condiment sets, explain how <b>both</b> designs have been influenced by function.                         | 4 |
| (e) Describe the aesthetic appeal of <b>both</b> condiment sets from a consumer's viewpoint.  | 4 |
| (f) Describe the ergonomic issues associated with the use of the condiment sets.  | 4 |

**Total for Section A (30)**

**[Turn over**

## SECTION B

2. The kitchen utensils shown below are manufactured from melamine with hardwood handles.



- (a) (i) State the name of the manufacturing process used to produce the melamine heads of the utensils. 1
- (ii) Explain why this process is suitable for the production of these parts of the product. 2

This range of products comes with a variety of hardwood handles.

- (b) (i) State **two** valid reasons for using hardwood for the handles. 2
- (ii) Explain the implications, for both the manufacturer and consumer, of using a range of hardwoods. 3
- (8)**

3. Companies produce a series of prototypes of their products before manufacture.



**Dyson DC24 Bagless Upright Vacuum Cleaner**

- (a) For the product shown above, name and justify **two** strategies that the company could use to evaluate the performance of their prototype before the product goes into production.
- (b) State the name of and justify **two** further strategies that the company could use to evaluate the potential success of this product.

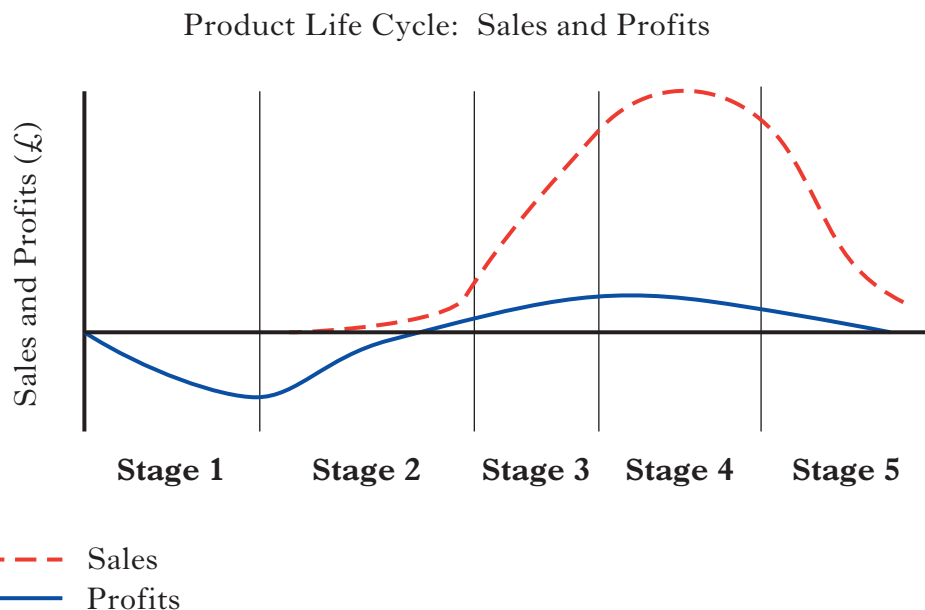
4

4

**(8)**

**[Turn over**

4. **Product Life Cycle**



The graph above shows sales and profits of a product over time.

Rapid prototyping is used during the Development Stage of a product. **(Stage 1 on the graph.)**

- (a) Describe how the use of Rapid Prototyping has impacted upon the Development Stage of the Product Life Cycle. 2
- (b) Explain the Life Cycle shown in the graph above for **stages 2–5**. 6

**(8)**

5. The global debate surrounding climate change has put pressure on society to address environmental issues. As a result, consumers are increasingly environmentally conscious.

(a) Describe how designers and manufacturers can use materials to ensure their products are environmentally friendly. **4**

(b) Describe the steps manufacturers can take to ensure consumers are better informed about how “green” products are. **2**

**(6)**

**[Turn over for Question 6 on *Page eight***

6. Two products that satisfy the same functional requirements are shown below.



**Eames La Chaise**

**Designers:** Charles and Ray Eames  
1948

**Material:** Fibreglass-reinforced plastic, metal and wood

**Manufacture:** GRP moulding



**Lounge Chair**

**Designers:** P Hvidt & O Molgaard-Nielsen  
1947

**Material:** Beech and teak plywood

**Manufacture:** Steam bending, laminating

When the chairs were developed, their design was at the “cutting edge” of technology.

(a) What aspects of the production processes enabled the designer to explore new styles and forms regarding chair design?

6

Today’s cutting edge technology has led to the increased use of composite materials.

(b) What advantages and opportunities do composite materials offer today’s designer?

4

(10)

**Total for Section B (40)**

[END OF QUESTION PAPER]