

# **X211/701**

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NATIONAL  
QUALIFICATIONS  
2010

TUESDAY, 18 MAY  
1.00 PM – 4.00 PM

PRODUCT DESIGN  
ADVANCED HIGHER

100 marks are allocated to this paper.

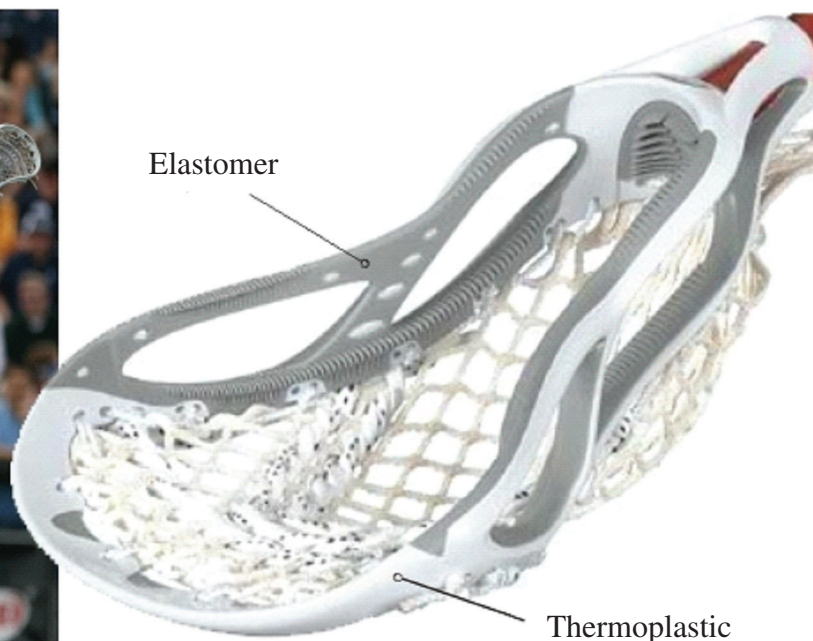
Where appropriate you may use sketches to illustrate your answer.

For question 7, answer either 7(a) or 7(b).



Attempt ALL questions.

1.

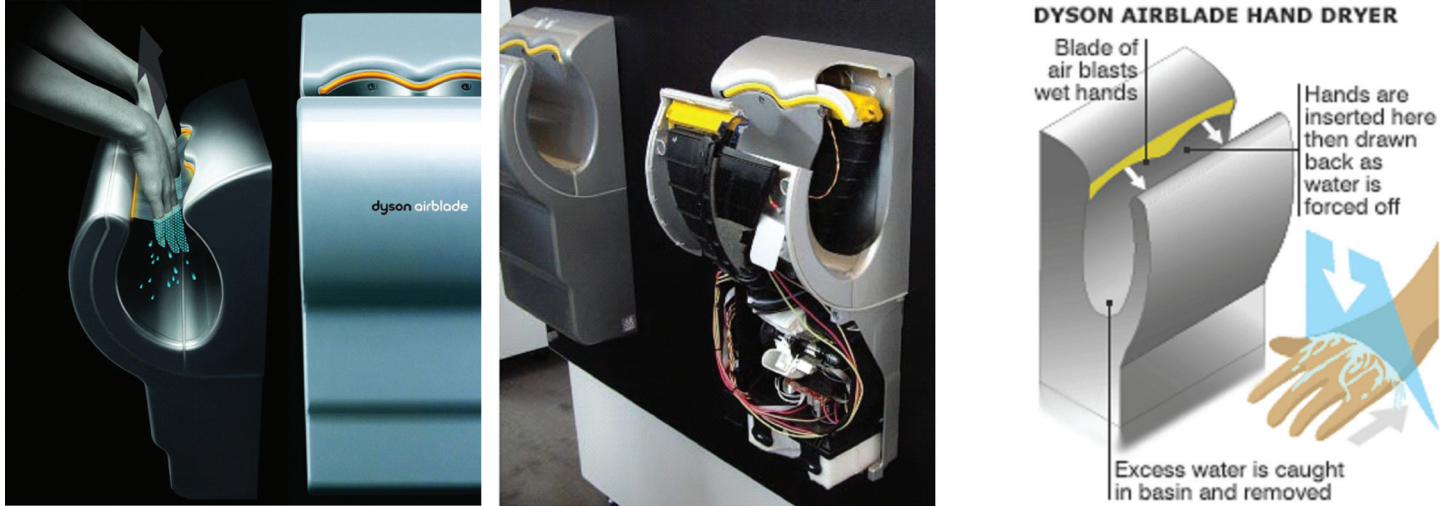


The lacrosse stick head shown above shows significant developments from the early wooden sticks. It is now manufactured using a combination of elastomers and thermoplastics.

- (a) Explain with reference to material properties, why combining materials in this way has improved the performance of the stick head. 6
- (b) Justify a suitable manufacturing process for the stick head. 2
- (c) Describe **two** difficulties of manufacturing the stick head and explain how these could be overcome. 4

(12)

2. The Dyson Airblade hand dryer shown below is claimed to be the most efficient and effective hand dryer on the market. Powered by a digital motor, it produces an air flow of 400mph and dries hands in 10 seconds, using 80% less energy than other dryers, and it is more hygienic.



Dyson engineers have spent three years developing the Airblade considering a range of design issues.

- (a) Explain why aesthetics, function and environment would be of particular importance to the success of a new and innovative product such as the Airblade.

6

Developing a successful product, such as the Airblade, often requires balance and compromise.

- (b) Describe how the **function** of the Airblade will have been influenced by the other two factors (aesthetics and environment).

4

- (c) (i) Describe an activity a designer could undertake during the initial stages of the design process to identify the most important issues.

2

- (ii) Explain why modelling is useful for exploring the balance of conflicting issues during the development of a product such as the Airblade hand dryer.

2

- (iii) Describe the measures a company could employ to ensure their product is safe, efficient and useable before going into full production.

2

(16)

[Turn over

3. Traditionally, a number of separate instruments are required for cutting and clamping a newborn child's umbilical cord.



The Joey Clamp & Cutter shown below performs both the surgical cutting and the clamping procedure in one single-handed action, while attaching a friendly koala character to the umbilical cord.



Research would be carried out at various stages in the development of this innovative product.

- (a) Describe a possible research strategy that may have been carried out to ensure the **safe** and **hygienic use** of the product. Your answer should include:
- methods of gathering information;
  - who would be consulted.
- (b) Describe how the designer has made this very functional object user friendly.

6

3

The design opportunity for this product was a perceived need by a doctor.

- (c) Describe **two** other starting points for innovative products. Use examples to illustrate your answer.

4



4.



Large companies often use **celebrity endorsements** and **sponsorship** of global events as marketing tools to maintain or increase market share.

- (a) Describe the potential benefits and drawbacks of these marketing tools. 4
- (b) Describe **two** other marketing tools companies may use to maintain or increase market share. 4

Design faults can lead to product recalls.

- (c) Describe the consequence of a product recall on a company. 2
- (d) Describe a strategy the company could employ to successfully re-launch the product after recall. 2

Companies often use branding to promote their products.

- (e) Describe how a company has made good use of branding to promote their company image. Use examples to illustrate your answer. 2
- (14)**

[Turn over

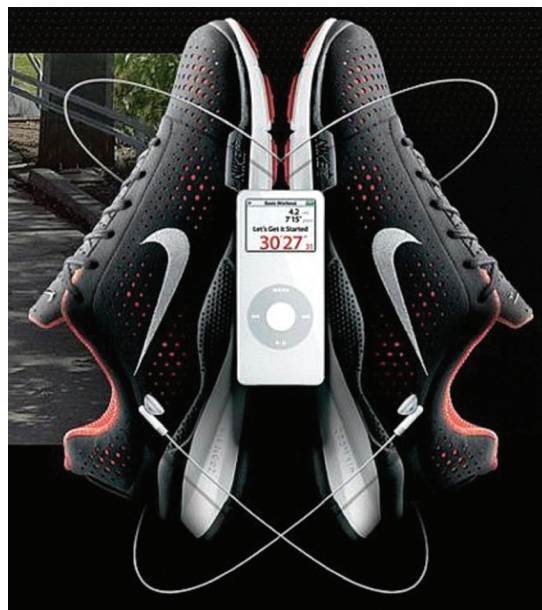
5. Products can evolve slowly over time or make giant leaps forward. Below is a concept design for the Nokia mobile phone developed by Seymour Powell.



Radical change to a product is often thought of as a high risk strategy.

- (a) (i) Describe the problems that radical change can create for the manufacturer. 3
- (ii) Describe the potential problems created when marketing a radically changed product. 3
- (iii) Describe possible conditions in the marketplace that would merit a radical change to a product. 3

Advances in material and technology can produce design opportunities such as the high tech running shoe developed by Nike and Apple shown below.



With reference to product(s) you are familiar with:

- (b) (i) describe how materials have influenced the evolution of the product(s); 2
- (ii) describe how advances in technology have influenced the evolution of the product(s). 3

## 5. (continued)

Products will continue to evolve. Social and technological changes will influence their evolution, generating improvements for both the consumer and manufacturer.



- (c) State the issues that are likely to influence the design of the family car and describe how they are likely to impact on its future development.

3

(17)

**[Turn over**



6. Shopping trolleys are renowned for being difficult to use. The shopping trolley below was designed by IDEO to be more “user friendly”.



Trolley with removable baskets



Integrated hand scanner

- (a) (i) Describe how **two** features of the trolley will have been influenced by anthropometrics. 2
- (ii) Justify how **two** physiological interactions may have influenced the design of the shopping trolley. 2

Anthropometric data was used when developing the new trolley design.

- (b) Discuss the limitations of only considering anthropometric data when developing a new product such as the shopping trolley. 3

The psychological impact of a product can influence its success in the market place and is based largely on our first impressions.

- (c) Explain how the designer has created an image of a safe, modern, efficient, hygienic and easy to use trolley. 3

The design of the shopping trolley was a great success and gained IDEO awards and a reputation for innovation and creativity. However, it has never been used by any supermarket chain.

- (d) Explain why the shopping trolley may have been a commercial failure. 2

IDEO is one of the world's leading design firms employing over 550 individuals. Designers, engineers, human factor experts and business strategists all work together to produce a wide range of design solutions.

- (e) Describe the advantages and disadvantages of a large in-house design team structure. 4



7. Answer *either* Question 7(a) or 7(b).

- (a) “*Computer design is often bad design done on a computer.*” Mike Hicks

Computers can be used for a range of tasks in the design of products. It may be argued that products can be designed entirely on computers.

Consider this argument and discuss its validity. You should refer to strengths and weaknesses of using computers in various stages of designing products.

12

**OR**

- (b) “*Fashion is a form of ugliness so intolerable that we have to alter it every six months.*” Oscar Wilde

It may be argued that fashion and products are changed simply to generate sales for manufacturers.

Consider this argument and discuss its validity. You should use a range of examples to support your discussion.

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(12)

[END OF QUESTION PAPER]

## ACKNOWLEDGEMENTS

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Question 6—Two photographs of a shopping cart re-designed by IDEO for ABC's Nightline (1998) are reproduced by permission of ABC News.

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