

X211/13/01

NATIONAL
QUALIFICATIONS
2012

THURSDAY, 24 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).



1. The snow helmet designed by design studio, Notion, utilises textile padding surrounded by a hard plastic exoskeleton that provides structure and protection.



The designers applied a range of manual techniques in the initial development of the helmet and used computers during the development and testing.

- (a) The designers may have used the analogy of a tortoise shell to generate ideas. Describe how idea generation techniques can be used in the development of products. Use examples to illustrate your answer. 3
- (b) Describe the benefits rapid prototyping may have brought to the design of the helmet. 2
- (c) Explain how computers can be used to test products prior to their launch. 3
- (d) Explain the influence each of the following may have had in the design of the helmet:
 - (i) ergonomist;
 - (ii) accountant;
 - (iii) market researcher.8

(16)

2. Konstantin Grcic utilised the unique properties of Ultradur® High Speed plastic in the design of the Myto chair, shown below.

The material has high strength and flowability which enable the transition from a thick to a thin cross-section, allowing the complex design to be produced.



The Myto chair is aimed at the top end of the market where **relatively low numbers** of the product are sold.

- (a) Describe the economic constraints that would have to be considered when manufacturing and transporting the chair. 4

It may be possible to produce a similar chair using different materials.

- (b) Describe difficulties associated with producing a similar chair from sheet metal and explain how these could be resolved. 6

The designer made good use of the properties of Ultradur® High Speed plastic to produce an innovative chair for consumers.

- (c) Describe, with reference to products with which you are familiar, how new materials have been used to improve products and benefit consumers. 4

(14)

[Turn over

3. The London Cycle Hire Scheme was launched in 2008 to ease congestion and pollution. The scheme allows commuters to hire a Bixi bike for as little as £3 and provides over 5000 bikes and docking stations which are available at more than 300 locations throughout central London.



It is vital to develop a product that is fit for purpose.

- (a) Explain how the design issues below may have influenced the design of the Bixi bike and its docking station.

- Ergonomics
- Function
- Obsolescence
- Safety

12

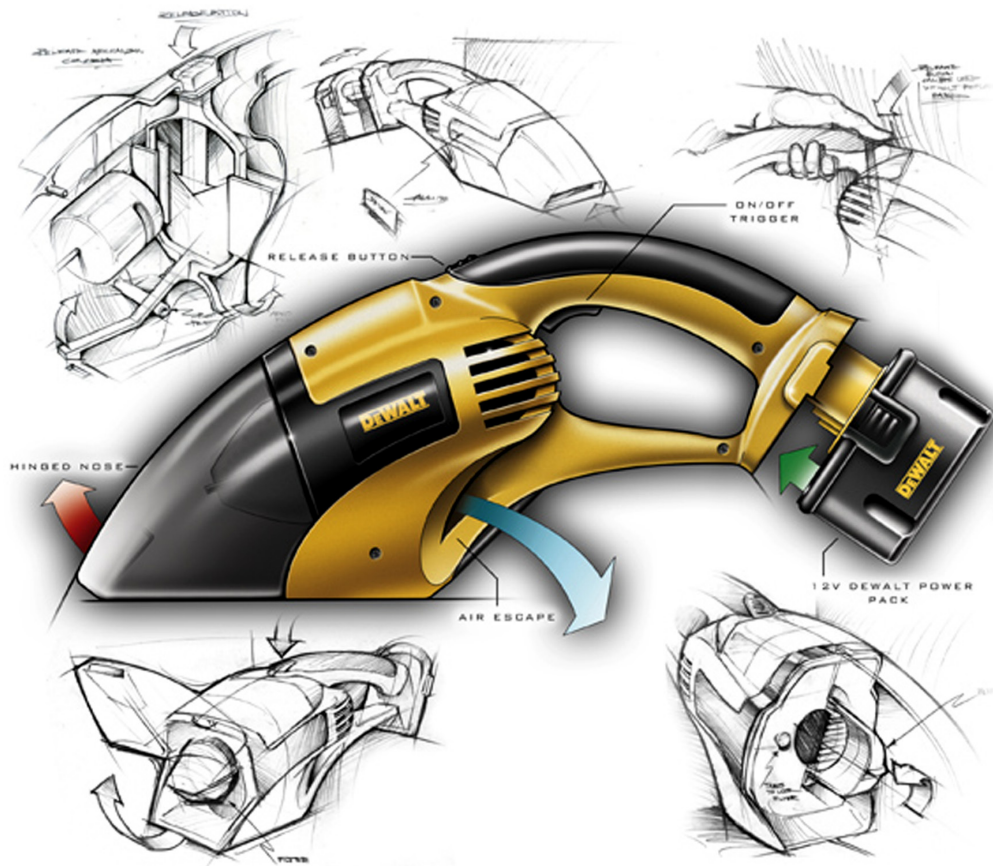
The scheme was heralded for its environmental benefits. However, it faced criticism for importing the bikes from Canada.

- (b) Explain why economic and environmental issues may influence the decision to import products from different countries.

4

(16)

4. The drawings below show part of the development of a new product.



A wide range of communication techniques are used during the design of a product.

- (a) Explain the advantages of using a variety of communication techniques when designing, planning and presenting the vacuum cleaner. 5

Redesigning an existing product can be a high risk strategy but if successful can increase a company's market share.

- (b) (i) Explain the risks associated with the redesign of an existing product. 3
(ii) Explain how the use of branding reduces the risks associated with launching a new product. 3

A company will often seek to protect their ideas, inventions and designs to give them a competitive edge in the market.

- (c) Describe the appropriate methods a company could use to protect intellectual property rights for a product such as the Dewalt vacuum cleaner. 5

(16)

[Turn over

5. The Urbee is a concept car which could become one of the most environmentally friendly cars to produce. It was designed with environmentally sustainable principles dictating every step of its design and production.



- (a) Describe the steps designers and manufacturers could take to ensure a product is environmentally sustainable.

4

Changes in today's society have created an increased demand for sustainable products.

- (b) Describe how society has influenced the development of other products.

4

Evaluation is an essential activity during the design and development of any product.

- (c) (i) Describe the features of an effective evaluation strategy.
(ii) Explain, using examples, why evaluation is an essential activity when developing products.

3

3

(14)

6. The concept for a standing wheelchair was designed by Jake Eadie as part of his University studies in Melbourne, Australia.



The standing wheelchair is far removed from current day wheelchairs and is a good example of a “concept design”.

- (a) Explain the benefits that “concept design” may bring to the consumer.

4

Products can also evolve through incremental change.

- (b) Describe the benefits of incremental change to the designer and to the manufacturer.

4

The consideration of ergonomics is vital in the development of all products.

- (c) Describe the activities the designer could have employed to ensure the wheelchair was ergonomically sound.

4

(12)

[Turn over for Question 7 on Page eight]

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

- (a) “*Don’t design for everyone. It’s impossible. All you end up doing is designing something that makes everyone unhappy.*” Leisa Reichelt

Many products are designed for a mass market. Describe the steps a designer may take to make products appealing to and usable by a wide range of people. You should use products to illustrate your answer.

(12)

OR

- (b) “*Design is redesign.*” Jan Michl

Many products have evolved over a long period of time and are improvements on previous products. Describe the evolution of products with which you are familiar, highlighting any key stages in their development.

(12)

[END OF QUESTION PAPER]

ACKNOWLEDGEMENTS

Question 1—Images showing Notion snow helmet. Permission is being sought from Notion.

Question 2—Photographs of the Myto chair. Reproduced by kind permission of Konstantin Grcic Industrial Design.

Question 3—Photographs showing London Cycle Hire Scheme bicycles. Reproduced by kind permission of Transport for London.

Question 4—Drawings showing part of the development of the DeWalt vacuum cleaner. Reproduced by kind permission of The Black and Decker Corporation.

Question 5—Image of Urbee concept car. Permission is being sought from KOR Ecologic Inc.

Question 6—Images of Jake Eadie's concept for a standing wheelchair. Reproduced by kind permission of Jake Eadie.