

X211/13/01

NATIONAL
QUALIFICATIONS
2013

WEDNESDAY, 29 MAY
1.00 PM – 4.00 PM

PRODUCT DESIGN
ADVANCED HIGHER

100 marks are allocated to this paper.

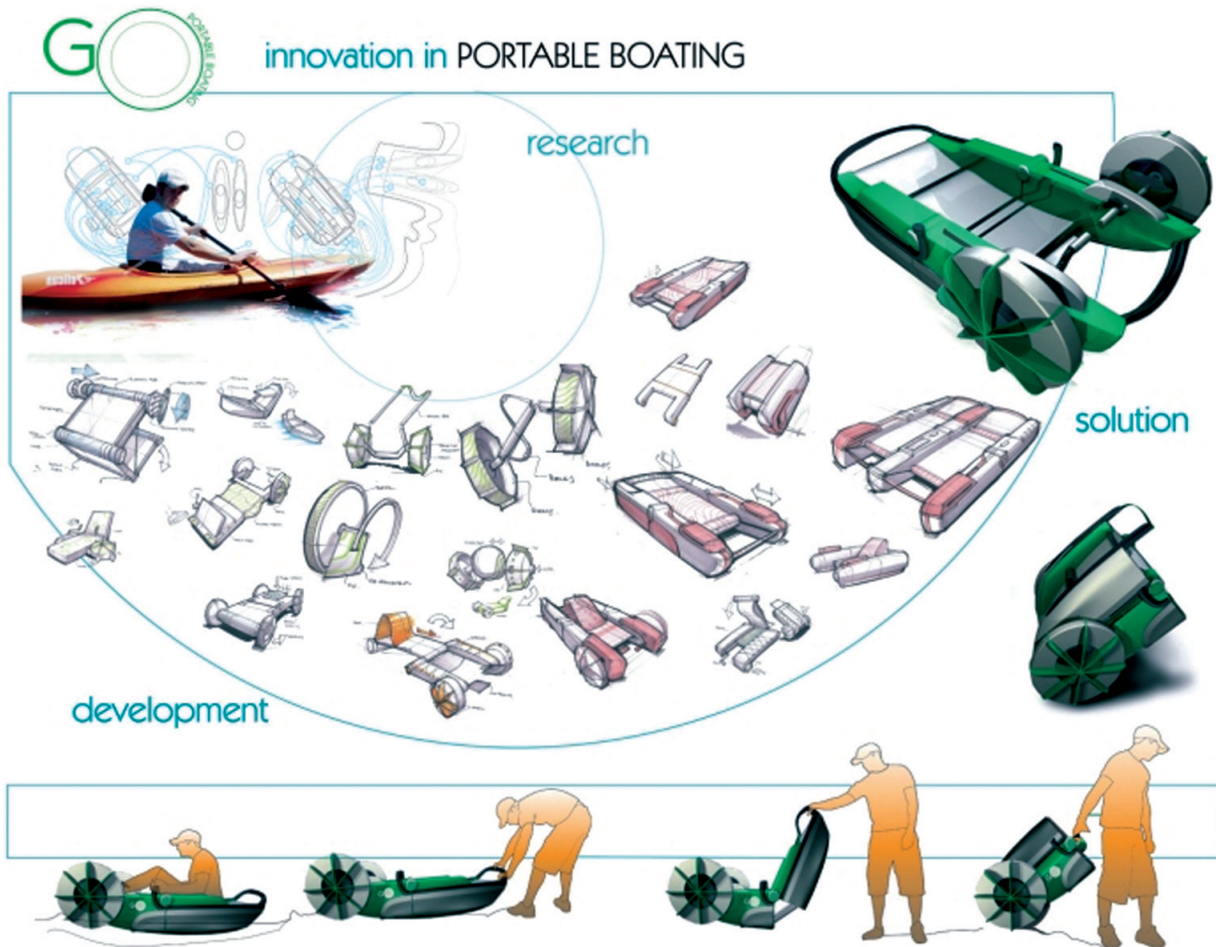
Where appropriate you may use sketches to illustrate your answer.

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



Attempt ALL questions

1. The Go portable boat, designed by John Fenno can be folded up and pulled like a luggage trolley. Marks



The designer has used a range of different techniques to explore, develop and present his ideas.

- (a) (i) Explain the advantages that freehand sketching could have offered during the initial stages of the design of the Go portable boat. 2
- (ii) Explain why modelling would have been an essential activity when developing the GO portable boat. 2

Production costs have a large impact on the success of a product.

- (b) (i) Describe how computers can be used to reduce the **production** costs of products. 3
- (ii) Describe other methods which could be used to reduce the **final** cost of products. 2

The designer's decision to replace traditional oars with paddles powered by the user's legs or arms will have a large impact on the boat's ergonomics.

- (c) (i) Explain how anthropometric data may have influenced the final dimensions of the Go portable boat. 2
- (ii) Describe how physiology may have influenced **two** aspects of the Go portable boat. 2

2. The HOC Rescue Power Tool, used by emergency services at road traffic accidents, was designed by Cenk Aytekin.



The cutting jaws could be manufactured by drop forging.

- (a) (i) Justify why this manufacturing process would be suitable for the production of the cutting jaws. 2
- (ii) Justify a suitable material for the cutting jaws. 2

The handle could be manufactured from an aluminium alloy using CNC machining.

- (b) Discuss the issues that may influence the manufacturer's decision to use CNC machining. 4

The designer of the HOC Rescue Power Tool has incorporated many features to ensure it is assembled to the highest standards.

- (c) With reference to products with which you are familiar, describe features that have been incorporated into the products to ensure ease of assembly. Use sketches to illustrate your answer. 5
- (d) Describe how the manufacturer could ensure the product is produced to the highest standards. 2

(15)

[Turn over

3. The Bathboard, which folds to save space, is a concept design by Sylwia Ulicka Rivera.



The success of the Bathboard will depend on the designer identifying suitable materials.

- (a) With reference to products with which you are familiar, describe how advances in materials have influenced the evolution of products. 5

Some products are developed entirely by in-house design teams, while others have elements of the design sub-contracted to consultants.

- (b) Describe the benefits of each of these approaches. 4

Changes in lifestyle and the home environment have resulted in a demand for innovative products such as the Bathboard.

- (c) Explain how changes in society have influenced the following aspects of products.

You should refer to examples to illustrate your answer.

- Aesthetics
- Economics
- Life expectancy

6

(15)

4. The Kranium helmet, designed by Anirudha Rao, looks to create an innovative, lightweight bike helmet that will revolutionise the helmet market.



The Kranium allows custom made helmets to be manufactured by scanning the user's head. The scan is used to create a helmet, where elements such as shape and fit are tailored to the user.

- (a) Describe how the use of new technology has influenced the **design and manufacture** of a product with which you are familiar.

4

The designer may have evaluated the Kranium at various stages of the design process.

- (b) Describe an evaluative activity that may have been used during the development stage of the helmet's design.

2

The design of the Kranium was heavily influenced by a number of issues.

- (c) With reference to products with which you are familiar, explain how each of the following issues may have influenced their design.
- Performance
 - Recycling
 - Safety

9

(15)

5. Two fire extinguishers are shown.

The Chubb Hydrospray Elite is one of the most powerful extinguishers in the world.

The Home Hero designed by Jonas Damon has won awards for its contribution to home safety.



Chubb Hydrospray Elite



Home Hero

- (a) Discuss how the different balance between aesthetics and ergonomics may have influenced consumer reaction to the extinguishers. 3
- (b) Describe a strategy designers could use to resolve conflict between:
- (i) Aesthetics and Function; 2
 - (ii) Environment and Production. 2

A wide range of activities can be used to research, develop and evaluate products.

- (c) Describe how the information gained from each of the following may have influenced the design of the Home Hero.
- Survey
 - User trip
 - Expert appraisal

6

(13)

6. Industrial designer Yves Behar's design team generated over two thousand ideas when developing the Clever Little Bag, an innovative solution to the problems created by traditional packaging.



Innovation often results in radical change being made to a product and/or its manufacture.

- (a) (i) Explain the advantages a company gains from developing an innovative product. 3
- (ii) Describe the problems associated with **producing** an innovative product. 3

Environmental principles have influenced the design and development of the Clever Little Bag.

- (b) (i) Describe the steps a company could take to reduce their product's impact on the environment. Refer to products with which you are familiar to illustrate your answer. 3
- (ii) Explain why an environmentally friendly product may not necessarily be a sustainable product. 2

Branding has been used extensively on the innovative Clever Little Bag project.

- (c) Describe the advantages and disadvantages offered to a company from branding innovative designs. 4
- (d) Describe a marketing strategy that would help a new company break into an established market. 2

(17)

[Turn over for Question 7 on Page eight

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

- (a) *“Great designers seldom make great advertising men, because they get overcome by the beauty of the picture—and forget that merchandise must be sold.”*

James Randolph Adams

Discuss the importance of correctly marketing products, how it could be done and the consequences of poor marketing. You should use examples to support your answer.

(12)

OR

- (b) *“Most people make the mistake of thinking design is what it looks like. People think it’s this veneer—that the designers are handed this box and told, “Make it look good!” That’s not what we think design is. It’s not just what it looks like and feels like. Design is how it works.”* Steve Jobs

Discuss this statement. You should illustrate your answer with examples of products which have evolved through restyling and others which have evolved due to changes in the way they work.

(12)

[END OF QUESTION PAPER]

ACKNOWLEDGEMENTS

Question 1—Images of the “Go portable boat” designed by John Fenno. Permission is being sought from John Fenno.

Question 2—Image of “HOC rescue power tool” is reproduced by kind permission of Cenk Aytekin.

Question 3—Images of “The Bathboard” designed by Sylwia Ulicka Rivera. Permission is being sought from Sylwia Ulicka Rivera.

Question 4—Images of “The Kranium Helmet” are taken from **www.anirao.com**. Reproduced by kind permission of Anirudha Rao (@anirao).

Question 5—Image of Chubb Hydrospray fire extinguisher is reproduced with kind permission of Chubb Fire & Security.

Question 5—Image of the “Home Hero” fire extinguisher designed by Jonas Damon. Permission is being sought from Arnell Group Inc.

Question 6—Images of Puma Clever Little Bag are reproduced by kind permission of Puma.