

X211/12/01

NATIONAL
QUALIFICATIONS
2012

THURSDAY, 24 MAY
1.00 PM – 3.00 PM

PRODUCT DESIGN
HIGHER

70 marks are allocated to this paper.



Attempt all questions

SECTION A

1. The products shown below have been designed and manufactured for use in pre-school, early years and primary schools.



Mobile Cloakroom Trolley

- Laminated MDF Panels
- Scratch resistant mild steel tubular frame
- 12 mild steel double hooks
- Large base storage area
- Self-assembly required
- Retail price £235



Cubby Storage Unit

- Strengthened tubular PVC plastic frame
- 4 HDPE plastic bins for shoe and bag storage
- Wall mounted
- Retail price £70

1. (continued)	<i>Marks</i>
(a) Outline a product specification for the design of one of the coat racks.	6
(b) Justify the choice of materials used to produce both of these coat racks.	6
(c) Justify the production methods that could be chosen to manufacture both coat racks.	6
(d) For both coat racks describe the safety issues that would affect:	
(i) the manufacture;	
(ii) the consumer.	4
(e) Explain how the design of both of these coat racks has been influenced by functional issues.	4
(f) Explain the issues surrounding the choice of both of the coat racks for:	
(i) the target market;	
(ii) end user.	4
Total for Section A	(30)

[Turn over

SECTION B

Marks

2. The garden kneeler shown below allows the user to work in comfort.
The product has been manufactured using the process of blow moulding.



- (a) **State** the name of a suitable material for the manufacture of the kneeler and justify your choice. 2
- (b) State **two** features that would indicate that the kneeler was manufactured using the process of blow moulding. 2
- (c) Justify why blow moulding was used for the manufacture of the kneeler. 1
- (5)**

3. Modelling is an important part of the design process.

For each of the modelling types below, describe the information that would be gathered from their use.

The three modelling types are:

- **Scale models** 2
 - **Test models** 2
 - **Prototypes.** 2
- (6)**

4. Many companies such as Dyson register their name as a trademark.

(a) Explain why they do this.

2

A company such as Dyson will create many new designs like the Ball™ shown below.

They will then patent these designs.



Ball™ technology

(b) Explain why companies patent their designs.

2

(4)

[Turn over

5. The Evac+Chair is used to transport a mobility impaired individual down stairs in a safe, smooth, and controlled way.



The consideration of ergonomic issues in the design of this product was vitally important.

With reference to the Evac+Chair, describe the ergonomic issues that may have been considered in terms of:

- (a) Anthropometrics; 3
 - (b) Physiology; 3
 - (c) Psychology. 3
- (9)**

6. The car wheel shown below is a one-piece aluminium alloy sand casting. It has been chrome plated.



- (a) Justify the choice of sand casting for the manufacture of this wheel. 2
- (b) Explain why additional machining was necessary after sand casting the wheel. 2
- A product such as the alloy wheel shown above can also be manufactured by Pressure Die Casting.
- (c) Explain the benefits gained by manufacturing the wheel using this process. 3
- (d) Explain the benefits of using alloys rather than pure metals. 2
- (9)**

[Turn over for Question 7 on Page eight

7. Luxottica Group S.p.A. is a manufacturer of high quality sunglasses.



The Ray-Ban® Aviator®

Made of gold-plated metal with mineral glass lenses. Originally designed for US military fighter pilots in 1937.

Made from carbon fibre for legs and a resin composite lens. Designed as part of the 2009 range.



The Ray-Ban® Tech

In the design of a product such as sunglasses, certain factors have a major influence on the outcome of the product.

(a) Other than Aesthetics and Ergonomics, **justify two** other factors that you consider to be important in the design of these products. 4

Companies such as Luxottica must keep up to date with their designs to ensure their continued success within the market place.

Fashion and **Style** are two important factors that ensure that Luxottica remain a world leader in the manufacture of sunglasses.

(b) Explain the difference between **Fashion** and **Style** in relation to these products. 3

(7)

Total for Section B (40)

[END OF QUESTION PAPER]

ACKNOWLEDGEMENTS

Section B Question 2—Photographs of Hozelock Garden Kneeler. Reproduced by kind permission of Hozelock UK Ltd.

Section B Question 4—Photographs of Dyson Ball™ and components. Permission is being sought from Dyson Ltd.

Section B Question 5—Photographs of Evac+Chair. Reproduced by kind permission of Evac+Chair International Ltd.

Section B Question 7—Photographs of The Ray-Ban® Aviator and The Ray-Ban® Tech sunglasses, manufactured by Luxottica Group. Reproduced by kind permission of Luxottica Group.