

X211/701

NATIONAL
QUALIFICATIONS
2008

THURSDAY, 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).

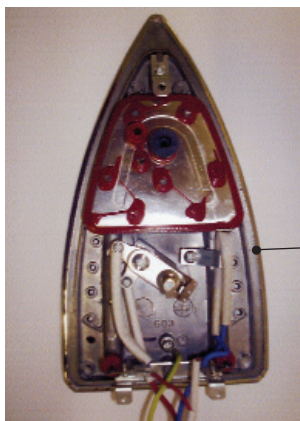


Attempt ALL questions.

1. The pictures below show the main parts of an iron.



**Component A
(Reservoir)**



**Component B
(Sole Plate)**

- | | | | |
|-----|-------|---|----------|
| (a) | (i) | From the table opposite, select and justify the most appropriate material for component A. | 1 |
| | (ii) | State and justify a suitable material for component B. | 1 |
| | (iii) | Justify suitable manufacturing processes for components A and B. | 4 |

The iron is assembled using a variety of fixing techniques, such as screws, snap fits and glues.

- | | | |
|-----|---|----------|
| (b) | Describe, using products with which you are familiar, the issues which would influence the choice of fixing techniques. | 5 |
|-----|---|----------|

Companies have a responsibility to manufacture products which are safe for consumers.

- | | | |
|-----|--|-------------|
| (c) | Describe procedures that a company could use to ensure that their products are safe for consumers. | 3 |
| | | (14) |

1. (continued)

Material	Thermal Properties	General Properties
1	Thermoplastic Rigid up to 85 °C Elastic mouldable range 120–185 °C	Hard and stiff, with good flexibility. Excellent optical properties; resists weathering by sunlight. Easy to fabricate by solvent cements. Machines and polishes well. Available in a range of opaque and translucent colours and transparent sheets.
2	Thermoplastic Rigid up to 85 °C Elastic range 100–145 °C	Flexible forms: soft, good electrical insulators, high chemical resistance. Rigid forms: stiff, hard, tough but light in weight, high resistance to chemical attack. Available in a wide range of colours. Difficult to join by solvents, has to be hot air welded.
3	Thermoplastic Rigid up to 100 °C Elastic range 105–130 °C	Hard wearing engineered plastic with high impact strength. Can be joined by solvents or hot air welding. Scratch resistant with high surface finish. Resistant to chemical attack. Available in limited colour range.
4	Thermoplastic Rigid up to 140 °C Very small elastic range	A light engineering plastic used in specialist applications. It is a hard, strong crystalline plastic. Can be brittle at low temperatures. Resistant to chemical attack. Can be joined by hot air welding. It is pliable and resistant to shock loading. Good resistance to repeated loading.

[Turn over

2.

Marks



The A-Bike, shown above, has been designed to be taken on public transport. It is lightweight, compact and can be folded in less than 10 seconds.

(a) Explain how each of the following factors could influence the **safe and efficient use** of the A-Bike.

- Ergonomics
- Function
- Safety
- Aesthetics
- Economics

15

New products can sometimes fail in the market place.

(b) Describe the safeguards a company can implement to reduce this risk.

4
(19)

[Turn over for Question 3 on *Page six*

3.



3. (continued)

Apple enjoy a large share of the MP3 market.

- (a) Describe the strategies Apple may have used to maintain their position and reputation in this market.

7

The latest iPod has evolved from the initial design launched in 2001 through a series of incremental changes. This has resulted in a large product range.

- (b) Describe the advantages incremental development offers the:

- | | |
|-------------------|---|
| (i) manufacturer; | 2 |
| (ii) consumer; | 2 |
| (iii) retailer. | 2 |

The development of the iPod has resulted in design opportunities for spin off products such as the iPod radio remote.

- (c) (i) Describe another design opportunity which has led to a spin off product.
- (ii) Describe **two** other ways in which design opportunities can arise.

2

4

(19)

4. Changes in materials and manufacture impact on the products we use and influence their development.

Describe how advances in each of the following have influenced changes in products. You should refer to products you are familiar with to illustrate your answer.

- Materials
- Manufacturing processes
- Technology
- Manufacturing systems

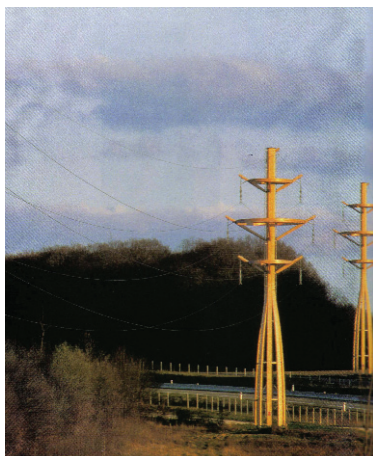
(12)**[Turn over]**

5. Designers often have to strike a balance between aesthetics and other factors. For each of the products shown below, describe how conflicting factors have influenced the product and how well this conflict has been resolved.



Product 1: **Aesthetics v Ergonomics**
Colani Camera

Product 2: Due to copyright restrictions,
Product 2 has been removed



Product 3: **Aesthetics v Environment**
Szekely Power Pylon



Product 4: **Aesthetics v Economics**
Ikea Frying Pan

(12)

6.

Marks



Dyson would have used a number of different visualisation techniques when developing their products from a concept to reality.

- (a) Identify the benefits offered by different types of visualisation techniques which could have been used in the design of Dyson products.

6

Dyson products are developed by an integrated in-house design team. Other design companies sub-contract elements of their work.

- (b) Describe the strengths and weaknesses of each approach.

6

(12)

[Turn over

7.



TYPICAL KITCHEN 1950's STYLE



DESIGNER KITCHEN 2005 STYLE

7. (continued)

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

Changes in our society and lifestyle influence the design of household products we use. There are many examples of this within the kitchen environment.

- (a) Describe the changes in society and lifestyle that may have contributed to the development of the modern kitchen environment.

12**OR**

“The ultimate design challenge of the twenty-first century is to avoid or minimise the adverse impact of all products on the environment.”

Alastair Faud-Luke

- (b) Describe the demands and opportunities this challenge will offer designers in the future.

12**(12)**

[END OF QUESTION PAPER]

ACKNOWLEDGEMENTS

Question 3—Picture of iPod products. Permission is being sought from Apple Inc.

Question 3—Picture of iPod or MP3 cover. Permission is being sought from Louis Vuitton UK.

Question 5—Picture of Canon camera. Permission is being sought from Canon UK Ltd.

Question 5—Picture of Ikea frying pan. Permission is being sought from IKEA.

Question 6—Picture of a Dyson. Reproduced by kind permission of Dyson Ltd.