National Qualifications 2018

X719/77/11 Design and Manufacture

FRIDAY, 18 MAY

1:00 PM – 3:00 PM

Total marks — 80

SECTION 1 — 30 marks

Attempt ALL questions.

SECTION 2 — 50 marks

Attempt ALL questions.

Write your answers clearly in the answer booklet provided. In the answer booklet you must clearly identify the question number you are attempting.

Use **blue** or **black** ink.

Before leaving the examination room you must give your answer booklet to the Invigilator; if you do not, you may lose all the marks for this paper.

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MARKS

SECTION 1 — 30 marks

Attempt ALL questions

In this section you will be asked questions relating to your knowledge and understanding of historical and current design influences.

1. (a) Describe how products have been influenced by new or improved materials. You must refer to specific products and materials in your answer. **6**

(b) Describe how factors other than materials have influenced the evolution of products with which you are familiar. You should make reference to some of the following:

- economics
- legislation
- global events
- changes in lifestyle
- communication
- transportation
- fashion and style **10**

(c) Describe how technology is used to make products more ergonomically sound. You must refer to specific technologies in your answer. **6**

The first microwave oven, produced in the 1940s, was nearly 2 metres tall. It took a further 20 years before the first commercially successful microwave oven was produced.

(d) Explain why products, such as the microwave oven, can take a long time to become commercially successful. **4**

Marketing has changed considerably over the last few decades due to the increased use and availability of technology.

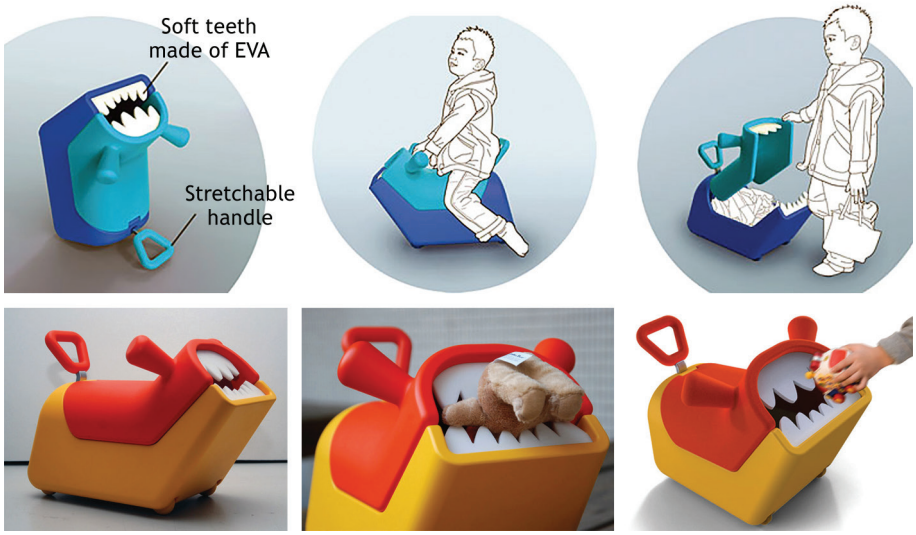
(e) Describe how companies use technology to market their products. **4**

MARKS

SECTION 2 — 50 marks

Attempt ALL questions

2. The Toy Guardian designed by Tzung-Yu Lu is a product developed to encourage young children to tidy their toys away.



The Toy Guardian was designed with careful consideration of the target market (parent and child).

(a) Describe how the design of the Toy Guardian has been influenced by the target market. **4**

Many of the Toy Guardian's components were manufactured by rotational moulding.

(b) Explain why rotational moulding is a suitable process for the body and lid of the Toy Guardian. **3**

For products to be successful, manufacturers must maintain a high level of quality assurance.

(c) Describe the steps a manufacturer could take to maintain a high level of quality assurance. **4**

[Turn over

MARKS

3. The Lytra shower prosthetic leg, designed by Harry Teng, enables lower leg amputees to shower safely and wash their residual limb effectively.

Designers often have to carry out research to help them design products with which they are unfamiliar.

(a) Describe a possible research strategy that may have been carried out to draw up a specification for the Lytra shower prosthetic leg. Your answer should include:

- methods of gathering information
- who would be consulted **6**

Designers use a wide range of modelling techniques to develop a product.

(b) Explain why modelling would be essential for the successful exploration and refinement of the Lytra shower prosthetic leg. **4**

The assembly of the Lytra shower prosthetic leg was carefully considered during its development.

(c) With reference to products with which you are familiar, describe features that have been incorporated into products to ensure ease of assembly. You may use sketches to illustrate your answer. **4**

MARKS

4. The BabyKing stroller, designed by Yunwoo Jeong for LG Electronics, is an innovative approach to baby care, incorporating smart technology to help new parents.

LG Electronics' diversification into baby care products is a move away from their normal product range of home appliances, mobile communications and home entertainment products.

(a) Describe the benefits and drawbacks of diversification. **4**

Successful companies like LG Electronics apply a range of strategies to maintain their market share.

(b) Describe strategies companies can use to maintain their market share. **4**

[Turn over

MARKS

5. The EcoSlice, designed by Jia-Ruei Lin, is an environmentally friendly product that uses old tennis balls to remove water from tennis courts.

Reuse is one strategy to reduce a product's impact on the environment.

(a) Describe other ways in which a company could reduce their product's impact on the environment. **4**

A range of graphic techniques was used when designing the Ecoslice.

(b) Explain why different graphic techniques are required throughout the design process. **4**

MARKS

6. A prototype of the TF-X concept flying car designed by Terrafugia will be ready for testing soon, and may be available commercially as early as 2024.

The TF-X will have self-driving capabilities and could have a huge impact on the economy, the environment and society.

(a) Describe how commercial products with which you are familiar have impacted on the economy, the environment and society. **5**

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

(b) Describe the methods a company could use to protect their intellectual property rights (IPR). **4**

[END OF QUESTION PAPER]

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Section 2 Question 2 – Images and reference to The Toy Guardian designed by Tzung-Yu Lu.

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