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.
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. The development of the transistor radio in 1954 is a key turning point in the evolution of portable music players. This notable turning point was made possible through advances in technology and the availability of new materials.

(a) Describe how advances in technology and the introduction of new materials have led to notable turning points in the evolution of products with which you are familiar.

Changes to a product during its evolution are not always a commercial success.

(b) Explain why changes to products are not always a commercial success. You must refer to specific products in your answer.

The work of a designer can often be identified by the aesthetic characteristic of their products.

(c) Select a designer and describe the aesthetic characteristics of their work. You should use products to illustrate your answer.

Our growing demand for products has resulted in the evolution of modern production systems.

(d) Describe how modern production systems have influenced the products we buy today.

Product evolution is heavily influenced by social change.

(e) Describe how changes in society have influenced the evolution of products with which you are familiar.

Pressure to produce sustainable products has encouraged designers and manufacturers to seek alternatives to traditional materials and technologies.

(f) Describe how emerging technologies and materials are being used to create more sustainable products.
2. The Mom Inflatable Incubator concept, designed by British student James Roberts, was designed to be an affordable solution to reduce infant mortality in the developing world.

Designers will consider a range of issues when designing products.

(a) Identify issues which are likely to have been considered during the development of the Mom Inflatable Incubator and explain how they may have influenced the design.

The Mom Inflatable Incubator could be marketed for either the developing or the developed world.

(b) Describe the differences between marketing the Mom Inflatable Incubator for the developing and developed world.
3. Employees at the BMW plant in Germany have been supplied with their own 3D-printed super-thumbs to reduce the stress on their joints, experienced when assembling cars. A scan of the user’s thumb is used to produce the custom thumb protectors.

Each individual super-thumb was made possible by using new production technologies.

(a) Describe how advances in technologies have enabled the production of products with which you are familiar.

BMW have a reputation for producing high quality products.

(b) Describe methods a company could use to ensure production of high quality products.
4. The VACOped boot is used to aid recovery from injuries of the foot and ankle. The liner, filled with Styrofoam balls, has the air removed to give a tight fit.

The VACOped boot is made using a range of materials and production methods.

(a)  
(i) Explain the issues the designer will have considered when selecting materials for the:
   - replaceable sole
   - outer shell.

(ii) Describe how volume of production may have influenced the selection of production methods for the VACOped boot.

Ergonomics would have been considered in the design of the VACOped boot.

(b) Describe how physiology and psychology may have influenced the design of the VACOped boot.
5. The 1 minute washing machine designed by Jung Hyun Cho and Bo Ram Hong, is an innovative concept for washing clothes.

The designers identified that more people are living by themselves and have a busy life. They used this change in social behaviour as a design opportunity.

(a) Describe other ways design opportunities may be identified.

The designers gave careful consideration to the environment when choosing suitable materials and manufacturing processes for the 1 minute washing machine.

(b) Describe other ways companies can reduce the environmental impact of their products.

Large companies sometimes develop radically different products which are not always a commercial success.

(c) Identify the difficulties a company could have when launching a radically different product and describe marketing activities they could employ to overcome these.
6. The Chariot Skates, designed by Michael Jenkins, are an innovative solution for personal transportation.

Several prototypes were used during the development of the Chariot Skates.

Describe how different modelling techniques could be used during the development of products to resolve issues relating to each of the following:

- Function
- Safety
- Ergonomics.

You should refer to your own design work or the development of products with which you are familiar.

[END OF QUESTION PAPER]
ACKNOWLEDGEMENTS

Section 2 Question 2 – Images and reference to *The mOm Inflatable Incubator.*
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