Surname	Centre Number	Candidate Number
Other Names		2

GCE A LEVEL – NEW

1603U30-1

S19-1603U30-1

DESIGN AND TECHNOLOGY – A2 unit 3
Product Design

FRIDAY, 7 JUNE 2019 – MORNING

2 hours 30 minutes

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1.	**8**	
2.	**8**	
3.	**12**	
4.	**12**	
5.	**8**	
6.	**8**	
7.	**12**	
8.	**12**	
9.	**8**	
10.	**12**	
Total	**100**	

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ADDITIONAL MATERIALS

A calculator, ruler, pencils and coloured pencils.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

Answer **ALL** questions.

Write your name, centre number and candidate number in the spaces at the top of this page.

Write your answers in the spaces provided in this booklet. If you run out of space, use the continuation page at the back of the booklet, taking care to number the question(s) correctly.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets at the end of each question or part-question. You are advised to divide your time accordingly.

The total number of marks available is 100.

You are reminded of the need for good English and orderly, clear presentation in your answers. The quality of your written communication, including appropriate use of punctuation and grammar, will be assessed in your answer to question **10**.

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Answer **all** *questions.*

1. Mineral water is sold in a variety of different size and shape transparent bottles. These bottles are generally produced from polymers.

(a) Name the manufacturing process used to produce the water bottles shown below and name the polymer used to manufacture the transparent bottle.

Process: ..... [1]

Polymer: ..... [1]

(b) Explain the benefits of using this polymer and this production process to the manufacturer when manufacturing the water bottles shown. [6]

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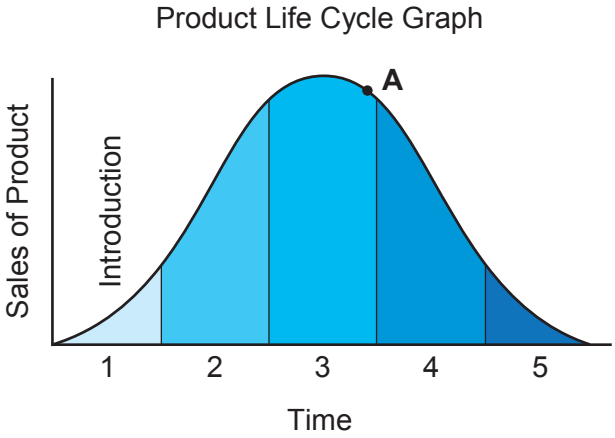
2. The life cycle for a typical production car like the one shown below can be up to five years as shown in the graph.



(a) There are distinct stages to a product life cycle as shown in the graph above. Describe the **four** stages that follow the introduction or launch of the new car. [4]

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(b) Describe what strategies a manufacturer could employ when the car reaches point **A** on the graph that could extend the life of the car. [4]

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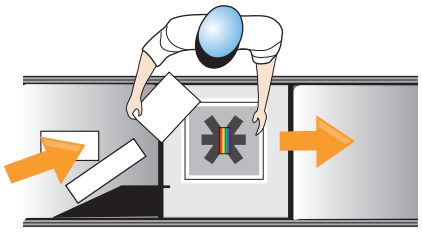
3. Ergonomics and anthropometrics make important contributions to the successful design of products.

(a) Explain how ergonomics is critical for the supermarket checkout operator shown in the picture below. [4]



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(b) Study the picture below and explain how anthropometric data has been applied in the successful design of the chair and desk. [8]

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4. The chassis of the trailer shown below is manufactured from galvanised mild steel sections.

(a) Explain what you understand by the term galvanising and state the advantages of using this process in the manufacture of the chassis. [4]

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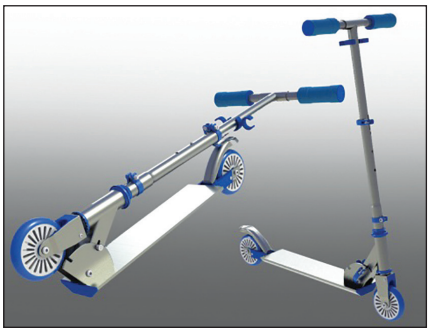
(b) Describe how the manufacturer has incorporated a different surface finish to each of the labelled parts on the garden tools shown below and explain the benefits of both surface finishes to the user. [8]

Examiner only

5. The image below shows a prototype of a new folding push scooter.



(a) Describe the importance and benefits of CAD during the design and development stages of the new folding push scooter. [4]

(b) Describe **two** advantages to the manufacturer of using pre-production prototyping when developing the new folding push scooter.

Advantage 1: ..... [2]

Advantage 2: ..... [2]

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6. The image below shows a production line where both in-house and standardised bought-in components are used during manufacture.

Evaluate how the use of standardised bought-in components benefits the manufacturer when assembling products on the production line. [8]

Examiner only

7. Product development is continually influenced by new, modern materials which improve the function of products.

(a) Modern tennis racquets often use carbon fibre in their construction. Describe the advantages of using carbon fibre in the manufacture of this product. [4]

(b) Spectacle frames often incorporate smart materials in their construction. Describe the advantages of using smart materials in the manufacture of this product. [4]

(c) Many bicycle frames, originally made from tubular steel, are now made from aluminium alloys. Describe why aluminium alloys are now used in place of tubular steel. [4]

Examiner only

8. High quality products are manufactured using stringent quality control and quality assurance processes.

(a) Explain how quality control and quality assurance ensure the production of high quality products. [6]

(b) Discuss the importance of quality control to the manufacturer and consumer. [6]

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9. Understanding the target market is critical to the success of a new product.

Describe what you understand by the term 'market segmentation' and explain its importance in the development of new products. [8]

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10. James Dyson is well known for his innovative approach to product design. Analyse the impact that his products have had on the market place. [12]

Marks will be awarded for the content of the answer and the quality of written communication.

END OF PAPER

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