Surname	Centre Number	Candidate Number
First name(s)		2

GCE AS/A LEVEL

2603U10-1

Z22-2603U10-1-R1

MONDAY, 16 MAY 2022 – AFTERNOON

DESIGN AND TECHNOLOGY – AS unit 1
Product Design

2 hours

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1.	**8**	
2.	**8**	
3.	**8**	
4.	**8**	
5.	**8**	
6.	**40**	
Total	**80**	

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ADDITIONAL MATERIALS

A calculator, ruler, pencil and coloured pencils.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen. Do not use gel pen or correction fluid.

You may use a pencil for graphs and diagrams only.

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 80.

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 **4**.

Examiner only

Answer **all** questions.

1. The photographs below show four different uses of mild steel.

(a) State the physical properties of mild steel that make it suitable for the uses shown above. [2]

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Examiner only

(b) The steel frame in parts of the building and the trailer has been galvanized. Give a detailed reason for this surface finish. [2]

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(c) Using notes and sketches describe a method of permanently joining mild steel to mild steel. [4]

Turn over.

Examiner only

2. Product designers and manufacturers have access to materials that are produced in 'stock size/form'.

(a) Explain the term 'stock size/form'. [2]

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(b) Describe the advantages to both the designer and manufacturer of materials being available in 'stock form'. [6]

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Examiner only

3. Reverse engineering and product analysis are two design strategies used within the iterative design process.

Analyse the importance of both strategies in the design and development of a product. [8]

Examiner only

4. Environmental issues are a world-wide concern. Study the image below and evaluate the advantages and disadvantages of using polymers in product design. [8]

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

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Examiner only

5. The storage unit below is manufactured from a regenerated material, plywood. The unit consists of three parts that are slotted together.

(a) Identify with reasons a possible method of manufacture for the End Piece. [2]

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Examiner only

(b) Using notes and sketches explain how the body of the unit could be formed. [4]

(c) State the properties of plywood that make it a suitable material for this storage unit. [2]

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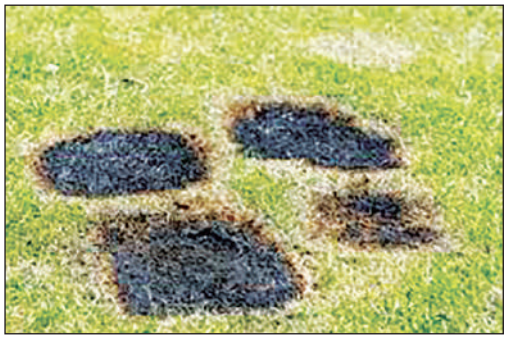
Examiner only

6. For a range of outdoor activities, from family picnics to music festivals, the use of disposable BBQs is both convenient and popular.



(a) With reference to the contexts above fully describe **four** different issues associated with the use of disposable barbecues. [8]

Examiner only

(b) Design a **reusable portable unit** that will hold a disposable BBQ. Use annotated 2D and 3D sketches to communicate your idea.

A standard size disposable barbecue is 300 mm x 300 mm x 100 mm.

Marks will be awarded for:

(i) an innovative and **reusable portable unit** that holds the disposable barbeque. [8]

(ii) how the unit addresses environmental issues. [4]

(iii) how it meets the safety requirements of the user when cooking the food. [4]

(iv) the quality of communication and the use of annotated, 2D and 3D drawings. [4]

Present your design idea in the space below.

You are not expected to render, colour or shade your design.

Examiner only

(c) (i) Give **two** detailed reasons why it is essential that a prototype is made before entering full-scale production. [4]

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(ii) The disposable BBQ is made in a developing country and sold in the UK. Discuss the advantages and disadvantages of this practice to the consumer in the UK and to the manufacturer. [8]

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END OF PAPER

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