

Surname	Centre Number	Candidate Number
First name(s)		2



GCE A LEVEL

1603U30-1



WEDNESDAY, 5 JUNE 2024 – AFTERNOON

DESIGN AND TECHNOLOGY – A2 unit 3

Product Design

2 hours 30 minutes

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1.	7	
2.	8	
3.	12	
4.	12	
5.	13	
6.	10	
7.	8	
8.	12	
9.	8	
10.	10	
Total	100	

ADDITIONAL MATERIALS

A calculator, ruler, pencils 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.

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

Answer **all** questions.

Write your answers in the spaces provided in this booklet. If you run out of space, use the additional 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. The acrylic trophy below has been glued together using liquid Tensol cement.



(a) When using liquid Tensol cement the manufacturer needs to follow COSHH regulations.

(i) State what the letters in the term COSHH stand for. [1]

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(ii) Discuss the key aspects the manufacturer would need to consider when working to COSHH regulations. [4]

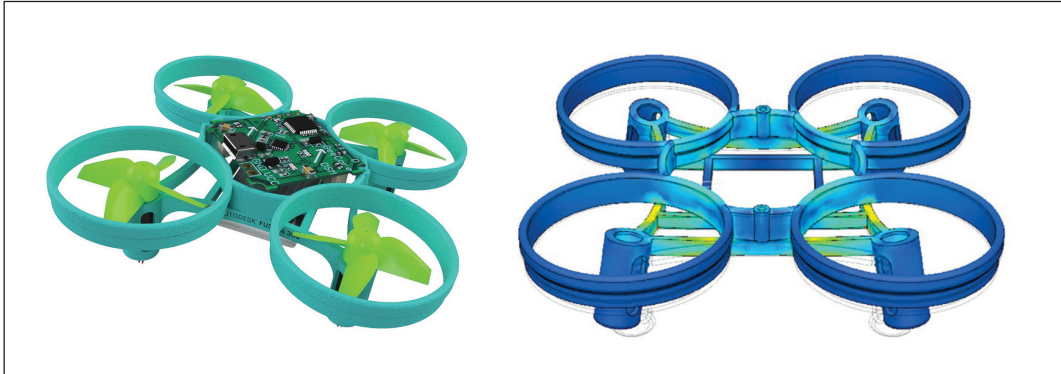
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(b) Explain a property of liquid Tensol cement that makes it an appropriate adhesive for the trophy. [2]

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2. The micro drone below has been developed using CAD.



(a) Explain **two** advantages of stress testing the product using CAD simulation. 2 × [2]

Advantage 1:

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Advantage 2:

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(b) The UK-based designer has decided to manufacture the micro drone in the Far East. Explain **one** benefit **and** **one** drawback to this global manufacture. 2 × [2]

Benefit:

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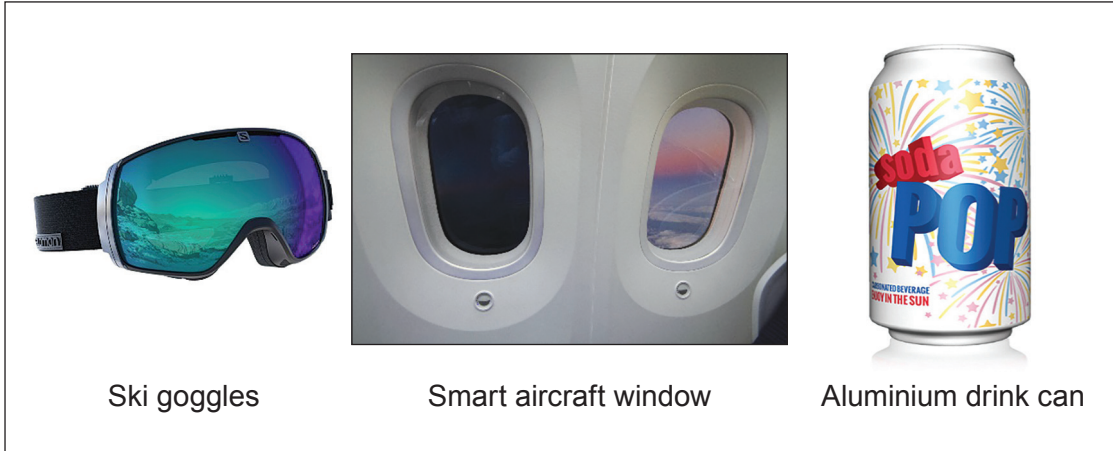
Drawback:

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3. The following products have been developed by incorporating different smart materials.



Ski goggles

Smart aircraft window

Aluminium drink can

(a) **Ski goggles**

State an appropriate smart material that has been incorporated into the ski goggles' lens and describe the properties that make it suitable.

[4]

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(b) **Smart aircraft window**

State an appropriate smart material that has been incorporated into the smart aircraft window and describe the properties that make it suitable. [4]

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(c) **Aluminium drink can**

State an appropriate smart material that has been incorporated onto the aluminium drink can and describe the properties that make it suitable. [4]

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4. The neck of the lamp below has been manufactured using the process of laminating.



- (a) Using notes and sketches, explain the process of laminating to achieve the curved neck of the lamp. [8]



(b) The lamp has been finished using beeswax. Explain the process of preparing the surface and applying the beeswax finish. [4]

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5. The metal board game token below has been manufactured using die casting.



(a) Explain **one** reason why die casting is a suitable manufacturing process. [2]

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(b) Name an appropriate metal and explain **one** key property that makes it suitable for the board game token. [3]

Appropriate metal:

Property:

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(c) Using notes and sketches, explain the process of die casting the board game token. [8]

Examiner
only



6. The razors below have been subject to incremental improvements over time.



(a) Discuss how the razors have benefitted from the incremental changes and the impact this has had on the user. [6]

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- (b) Throughout the application of incremental changes, the razor manufacturer considered the 'price' as part of the 4 Ps of marketing.

Explain the impact of effective pricing on a new razor product entering the market. [4]

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7. A coffee shop is looking to improve its environmental impact and rebrand their coffee cups.



Discuss the ecological footprint of the disposable polystyrene cup in comparison to the reusable bamboo cup.

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9. The Memphis design movement founded in the 1980s influenced the design of the products shown below.



Discuss how the Memphis design movement challenged the perception of good design. [8]

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