Surname	Centre Number	Candidate Number
First name(s)		2

GCE AS

B602U10-1

S25-B602U10-1

MONDAY, 12 MAY 2025 – AFTERNOON

DESIGN AND TECHNOLOGY – AS component 1

Product Design

2 hours 30 minutes

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1.	**10**	
2.	**13**	
3.	**12**	
4.	**8**	
5.	**10**	
6.	**6**	
7.	**11**	
8.	**9**	
9.	**9**	
10.	**12**	
Total	**100**	

B602U101
01

ADDITIONAL MATERIALS

You will need a ruler and a calculator.

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(s) at the back of the booklet, taking care to number the question(s) correctly.

INFORMATION FOR CANDIDATES

When and where appropriate, answers should be amplified and illustrated with sketches and/or diagrams.

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 number of marks available is 100.

You are reminded of the need for good English and orderly, clear presentation in your answers.

You may use a calculator in this examination.

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Answer **all** questions.

1. The images below show kitchenware made from melamine formaldehyde.





(a) Describe **two** properties of melamine formaldehyde that make it an appropriate material for the kitchenware.

Property 1: [2]

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Property 2: [2]

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(b) Explain **two** different functional qualities to be considered when designing the kitchenware.

Functional quality 1: [2]

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Functional quality 2: [2]

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Manufacturers often use primary research to find out consumers' opinions.

(c) Explain **one** primary research method a manufacturer may use to find out consumer opinions when designing kitchenware. [2]

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2. The lamp shown below is made from anodised aluminium and comes with the information labels shown.



CE

RoHS

(a) Explain **one** reason why anodising is a suitable finish for the lamp. [2]

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(b) Discuss what information the symbols on the labels provide for the consumer. [4]

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(c) Each lamp retails at £19.99. The manufacturer makes 23% profit on each lamp after manufacturing and distribution costs.

(i) Calculate the cost to the manufacturer of each lamp before profit. [2]
Show all calculations.

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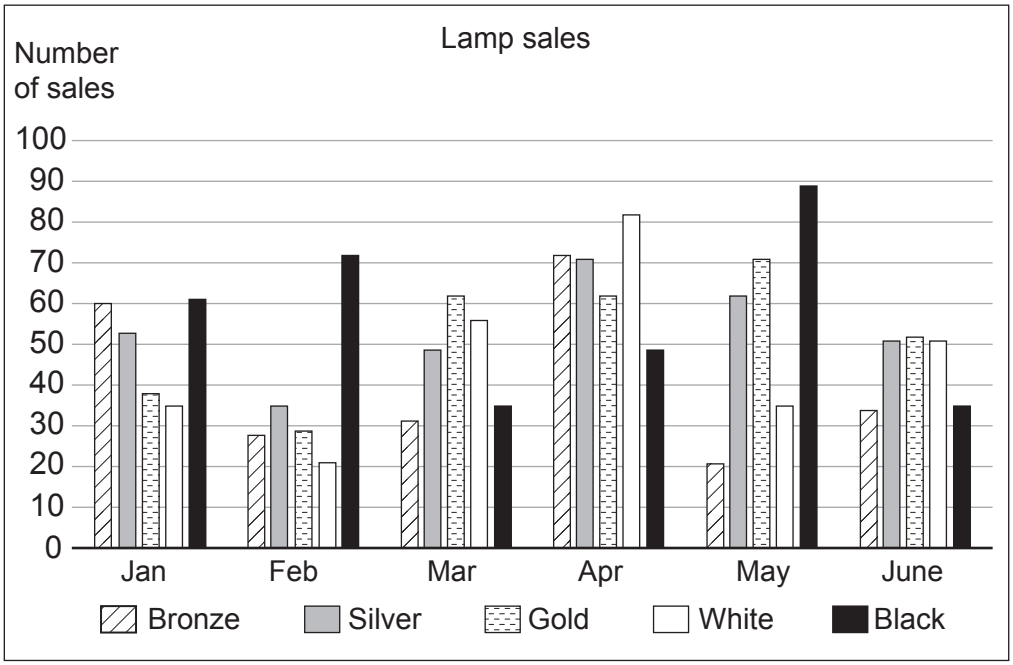
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(ii) Examine the six-month sales data for a range of different colour lamps.

	Jan	Feb	Mar	Apr	May	June
Bronze	60	28	31	72	21	34
Silver	53	35	49	71	62	51
Gold	38	29	62	51	71	52
White	35	21	56	82	35	51
Black	61	72	35	49	89	35



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Calculate the percentage sales of bronze and silver lamps against overall sales between March to May. [3]
Show all calculations.

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(iii) The lamp retails at £19.99 in the UK market.
The manufacturer wishes to sell the product in the EU market.
The current exchange rate = £1 to 1.20 Euros.

Calculate the sale cost of one lamp for the EU market. [2]
Show all calculations.

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3. Study the images shown of an outdoor planter.



Outdoor planter



High-density polyethylene plant pot insert

(a) Using notes and diagrams, describe how the plant pot insert has been manufactured using injection moulding. [4]

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(b) Explain how the properties of high-density polyethylene make it suitable for the plant pot inserts. [4]

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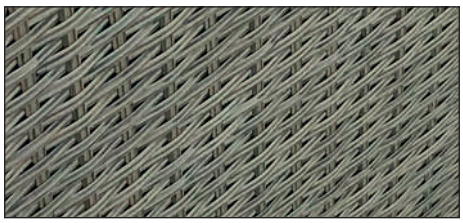
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(c) The outer casing of the planter is made from a PVC rattan weave.





PVC rattan weave

Explain how additives can be applied to PVC to improve the properties and function of the outer casing of the planter. [4]

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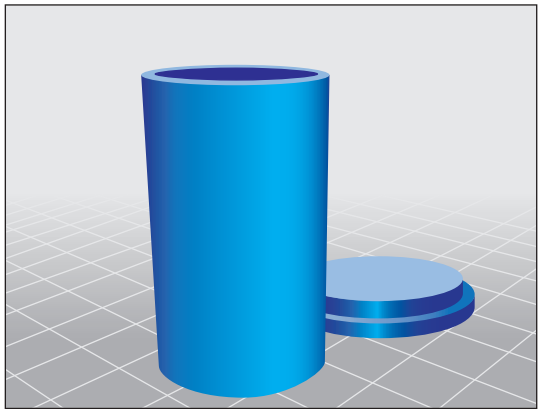
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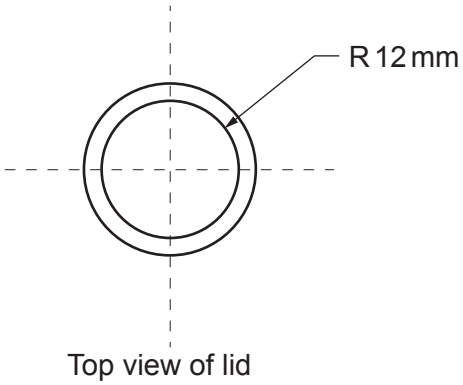
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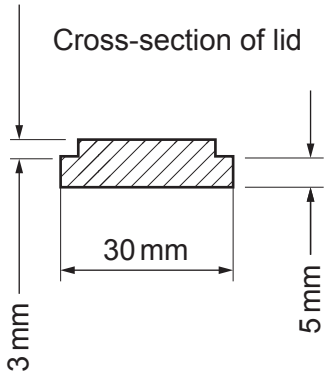
4. A designer has rapid prototyped a design for a canister to hold small drill bits.

Examine the 3D-printed canister and 3D and 2D CAD drawing below.









Not to Scale

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(a) (i) Find the volume of the lid in millimetres (mm) rounded to one decimal place. [5]
Show all calculations.

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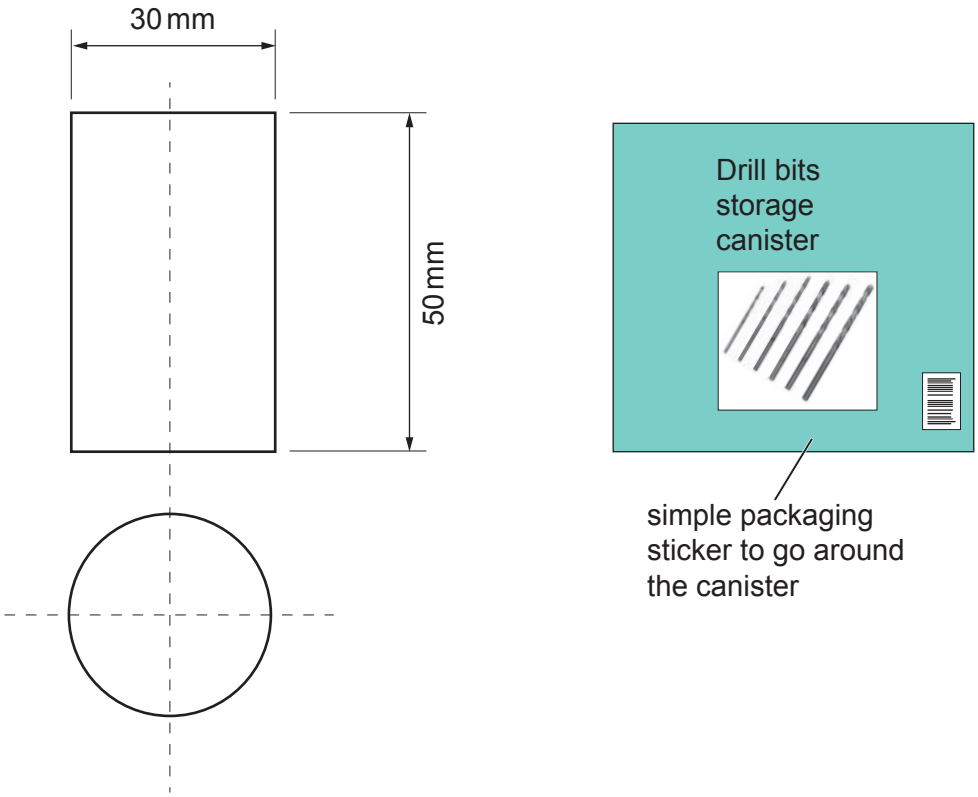
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Turn over.

(ii) The manufacturer wishes to place a sticker around the canister with company and product information.

Below is a sample of the sticker and the canister measurements.



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Calculate the surface area of the canister so the manufacturer can make the correct size sticker to go around it. Round your answer to one decimal place. [3]
Show all calculations.

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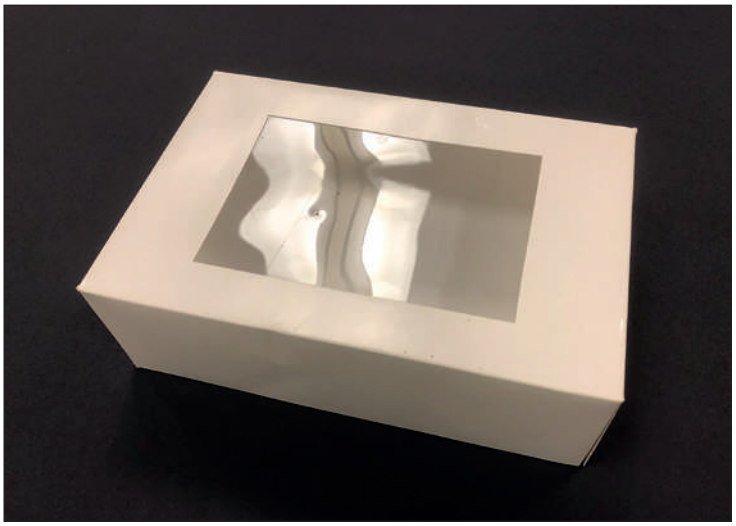
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5. Examine the image below of duplex board packaging for fresh cakes.



(a) Describe **two** reasons why duplex board is a suitable material for this product. [4]

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(b) Explain why die-cutting is a suitable method to manufacture the duplex board packaging. [2]

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(c) Below is a vacuum formed tray for a box of chocolates made from high impact polystyrene.



Explain what features are required to make a successful former for the tray. [4]

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6. Designers need to consider differences between cultures and markets when designing products.

Discuss the factors that a designer may consider when designing products for different cultures. [6]

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7. Examine the gaming mouse made from polypropylene, pictured below.





(a) Analyse the physical and mechanical properties of polypropylene that make it suitable for the gaming mouse. [5]

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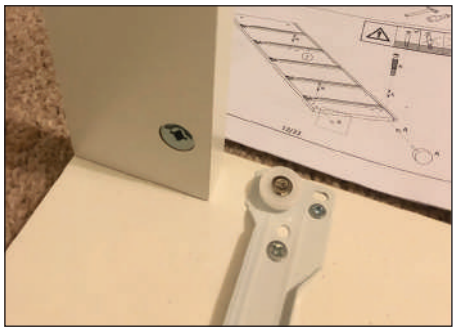
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(b) Evaluate how ergonomic and anthropometric considerations impact on the design of the gaming mouse. [6]

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8. Examine the examples of knock down fittings below, commonly used in flat-pack furniture.







Analyse the advantages and disadvantages of using knock down fittings in flat-pack furniture to the consumer and manufacturer. [9]

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9. The coffee machine below is an example of a product that has been mass produced.





Evaluate the use of ICT and automation when mass producing products. [9]

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10. Hardwoods, softwoods and regenerated materials are commonly used by construction companies for many applications when building homes.











Using a life cycle analysis, discuss the impact of using different hardwoods, softwoods and regenerated materials when building homes. [12]

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END OF PAPER

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Question number	Additional page, if required. Write the question number(s) in the left-hand margin.

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