Surname	Centre Number	Candidate Number
Other Names		2

GCE AS – NEW

B602U10-1

S19-B602U10-1

MONDAY, 13 MAY 2019 – 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.	**14**	
3.	**8**	
4.	**11**	
5.	**10**	
6.	**5**	
7.	**12**	
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.

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. Where the space is not sufficient for your answer, continue at the back of the book, taking care to number the continuation 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 image below shows a mass produced television remote control made from ABS [Acrylonitrile Butadiene Styrene].



(a) Describe **two** properties of ABS (Acrylonitrile Butadiene Styrene) plastic that make it appropriate for the remote control.

Property 1: [2]

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Property 2: [2]

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(b) Effective aesthetic qualities are critical when designing products.

Explain **two** aesthetic qualities to be considered when designing the remote control.

Aesthetic quality 1: [2]

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Aesthetic quality 2: [2]

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Rapid prototyping is essential when designing successful products.

(c) Explain **one** advantage of using rapid prototyping when designing the television remote control. [2]

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03

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2. Fitness for purpose is critical to the eventual success of a final product.



With reference to the design and production of the car shown answer the following.

(a) Explain **two** factors that the manufacturer must consider to ensure fitness for purpose and eventual success of the car.

Factor 1: [2]

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Factor 2: [2]

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(b) Explain **one** example of primary processing undertaken during the manufacture of a car. [2]

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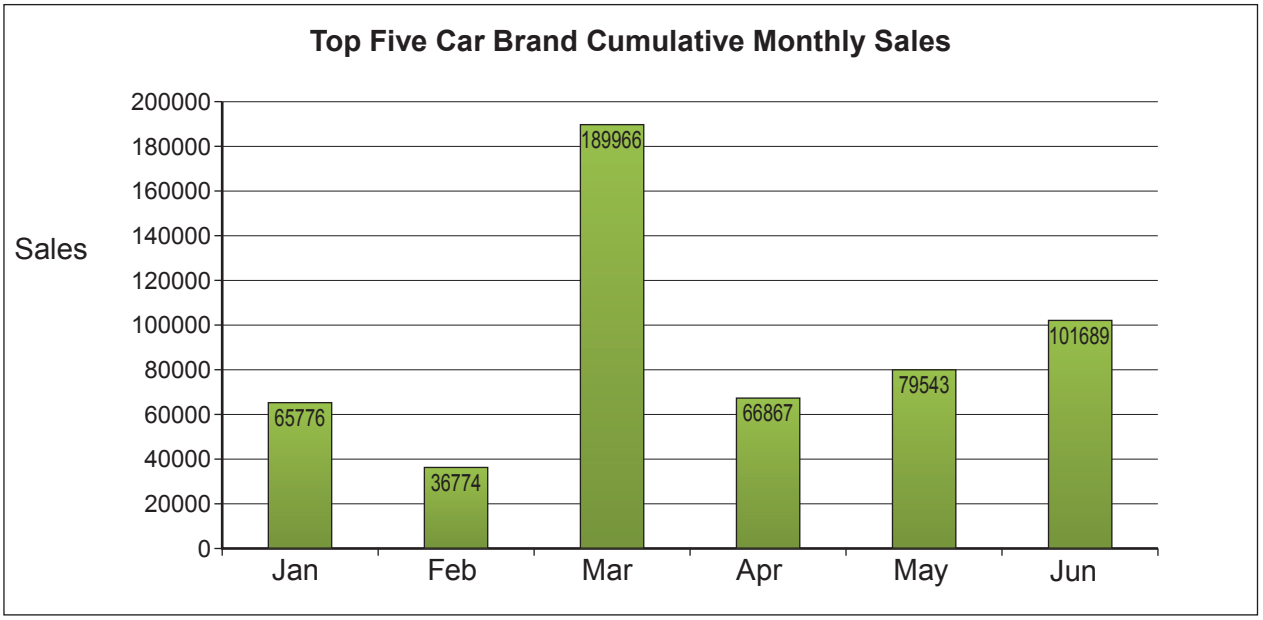
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(c) The graph and table shows the top five car manufacturers' monthly sales for January 2018 to June 2018.



Top five brands

	Jan 2018	Feb 2018	Mar 2018	Apr 2018	May 2018	Jun 2018
Manufacturer A	19,654	12,046	50,257	20,114	21,136	22,334
Manufacturer B	12,579	7,036	37,843	14,607	18,097	23,224
Manufacturer C	12,652	4,860	37,023	11,214	13,983	18,218
Manufacturer D	9,000	6,744	31,649	9,078	12,940	22,985
Manufacturer E	11,891	6,088	33,194	11,854	13,387	14,928

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(i) Calculate the mean (average) number of car sales during the 6 month period. [2]

Show all workings.

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(ii) Calculate the percentage share **Manufacturer B** has of the total sales of the top five brands. [2]

Show all workings.

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(iii) In January, February, March and April 2019 there has been a 4% increase in car sales.

In May and June there has been a 8% increase in car sales.

Calculate the new mean (average) for January to June 2019 rounded to the nearest whole number. [4]

Show all workings.

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3. Study the image below showing a decorative modern USB powered lamp.



(a) Use notes and diagrams to describe how the lamp body has been made from plywood using the laminating and steam bending process. [4]

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(b) Explain **two** properties that make plywood suitable for this product.

Property 1: [2]

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Property 2: [2]

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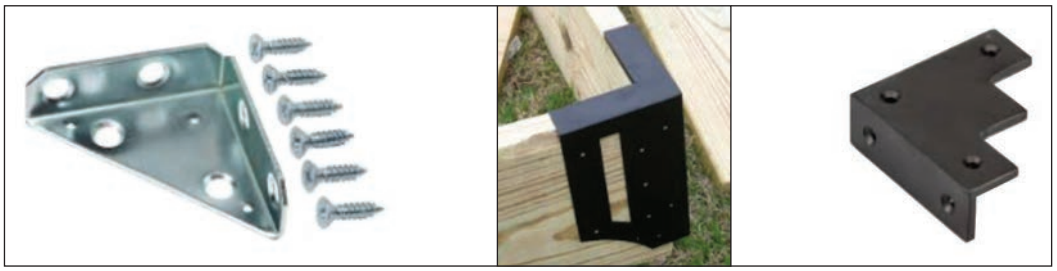
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4. The metal corner brackets pictured below are designed to strengthen corner joints in wooden structures.



(a) Explain why mild steel is a suitable material for these corner brackets. [2]

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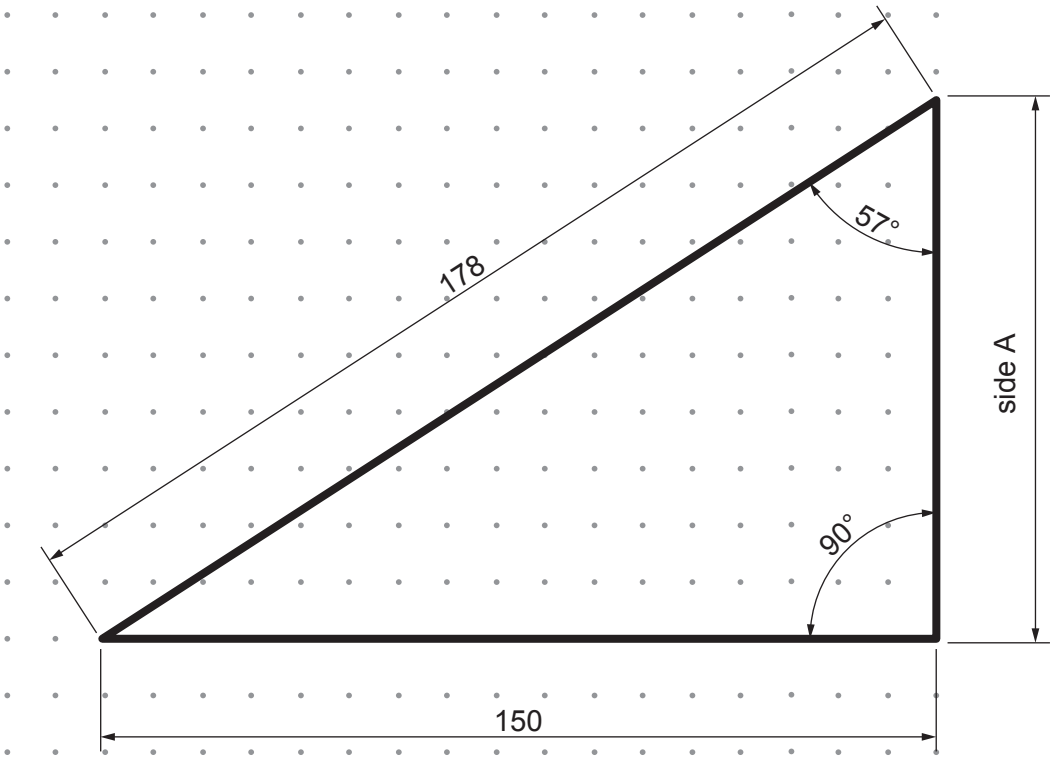
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(b) (i) Using the information on the diagram below, calculate the length of side A of a simple corner bracket. [3]

Show all workings.



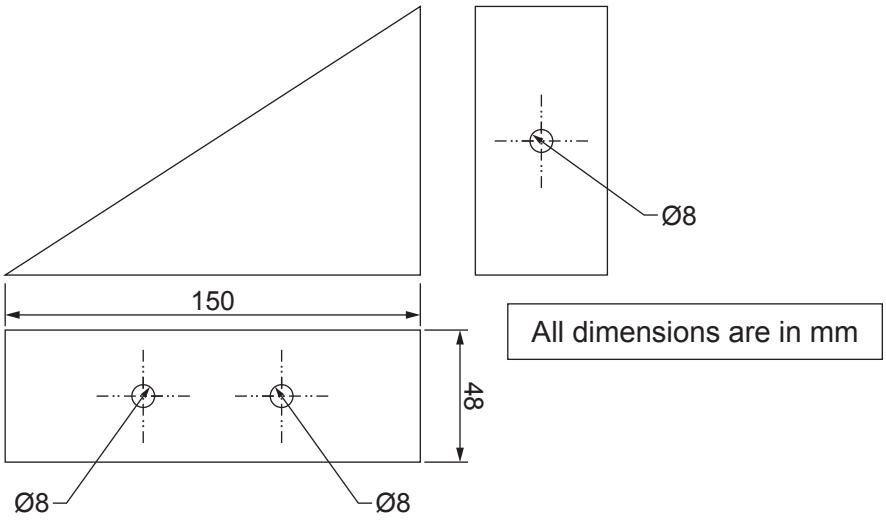
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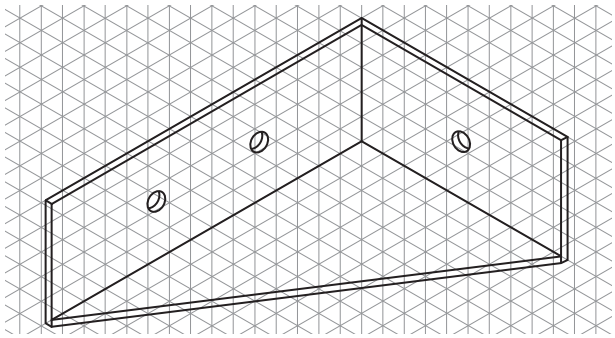
Turn over.

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The diagrams show a 2D working drawing and a 3D CAD drawing of the simple corner bracket with drilled holes for screw fixing.
(Drawings not to scale)

(i)





(ii) Calculate the external total surface area of the bracket in mm^2. [4]
Round your answer to a whole number.

Show all workings.

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(c) Describe why the mild steel bracket would need to be galvanised if it were to be used in an outdoor wooden product. [2]

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5. *(a)* Explain the meaning of the term 'Reverse Engineering'. [2]

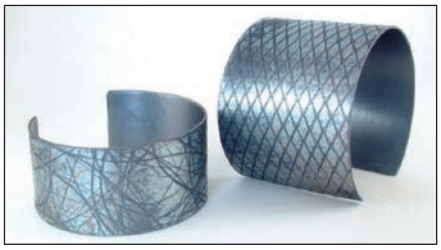
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(b) The bracelets below are made from aluminium and have been anodised.



Describe **two** reasons why anodising is a suitable finish for this product.

Reason 1: [2]

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Reason 2: [2]

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(c) Products such as the soft drink cans shown in the image are mass-produced.



Describe **two** advantages of using mass production when manufacturing the soft drinks can.

Advantage 1: [2]

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Advantage 2: [2]

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6. Explain how conducting effective risk assessments can protect employees in factory situations like the one shown below. [5]



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7. Cardboard furniture can be used in emergency and disaster relief situations where homes are damaged and destroyed.

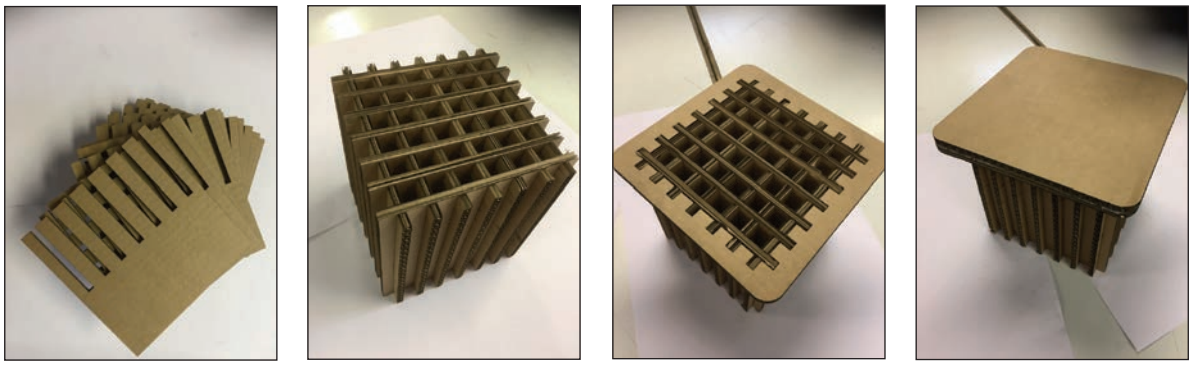




(a) Analyse and discuss the use of corrugated cardboard furniture in this context. [6]

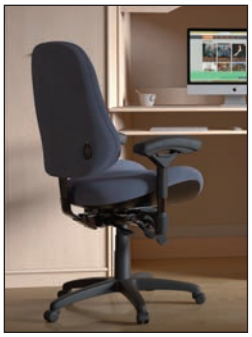
Examiner only

(b) Evaluate how the use of a laser cutter has benefited the manufacturer of flat packed self-assembly furniture such as the product below. [6]



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8. Ergonomics and anthropometrics play an important part in the successful development of an office chair such as the one below.



Analyse the role ergonomics and anthropometrics play in the successful development and design of an office chair. [9]

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9. The life cycle of a mobile phone can impact on the environment in many different ways.

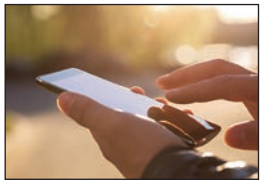


Using a life cycle analysis, evaluate the environmental impact of the mobile phone shown above. [9]

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10. Smart materials have had a significant impact in the development of many modern products.






Define the term 'smart material' and using specific products, describe the contribution of the named smart material. [12]

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