



GCE A LEVEL

1603U30-1

MONDAY, 2 JUNE 2025 – MORNING

DESIGN AND TECHNOLOGY – A2 unit 3

Product Design

2 hours 30 minutes plus your additional time allowance

Surname _____

First name(s) _____

Centre Number _____

Candidate Number 2 _____

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

ADDITIONAL MATERIALS

A calculator, ruler, pencils and coloured pencils.

INSTRUCTIONS TO CANDIDATES

Use black ink, black ball-point pen or your usual method.

You may use a pencil for graphs and diagrams only.

Write your name, centre number and candidate number in the spaces provided on the front cover.

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.

(Turn over)

INFORMATION FOR CANDIDATES

The number of marks is given in brackets at the end of each question or part-question.

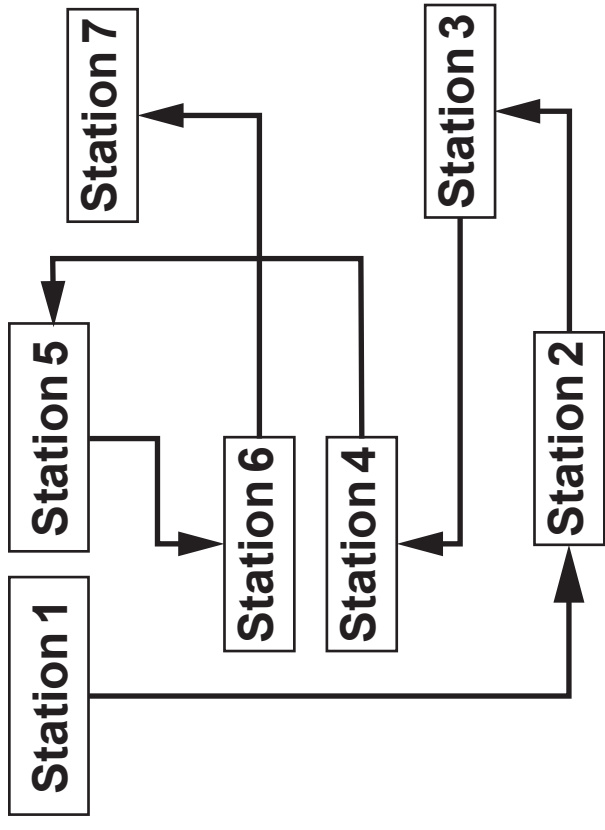
The total number of marks available is 100.

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.



Factory workstation plan



Answer ALL questions.

1. The virtual reality (VR) headset opposite is currently manufactured using seven stations, as shown in the factory workstation plan.

(a) The manufacturer wants to introduce cell production to manufacture the virtual reality (VR) headset. On the next page, sketch a new factory workstation plan that utilises cell production.

[2 marks]

(Turn over)

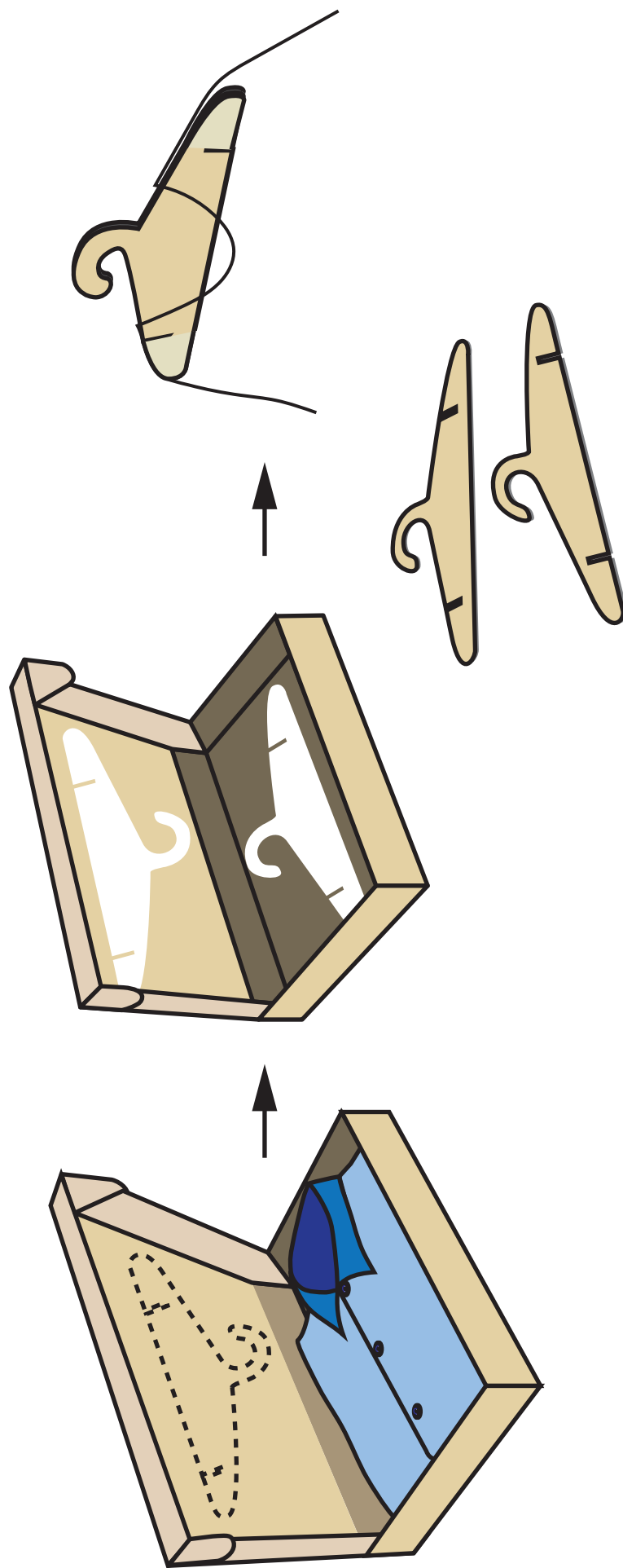
New factory workstation plan

1 (b) Explain how cell production would benefit the manufacturer. [4 marks]

- 1 (c) Emerging digital technologies such as virtual reality (VR) and augmented reality (AR) are increasingly being utilised within the manufacturing industry.**



Discuss how emerging digital technologies could benefit the manufacturing industry. [6 marks]



2. The cardboard packaging being developed opposite includes clothes hangers.

(a) Describe the environmental impact of the cardboard packaging. [2 marks]

(b) As part of the development process, the designer plans to laser cut the prototype package.

On the next page, draw a 2D net of the cardboard packaging that would need to be produced on a computer aided design (CAD) program, including all key features required.

(Dimensions / scale not required) [6 marks]

2 (c) Explain the key stages to successfully laser cut the CAD drawing of the packaging net. [4 marks]

3. Designers use a range of strategies and team working skills including brainstorming idea generation as shown below.



- (a) Explain the strengths and weakness of using a team approach when generating initial ideas.

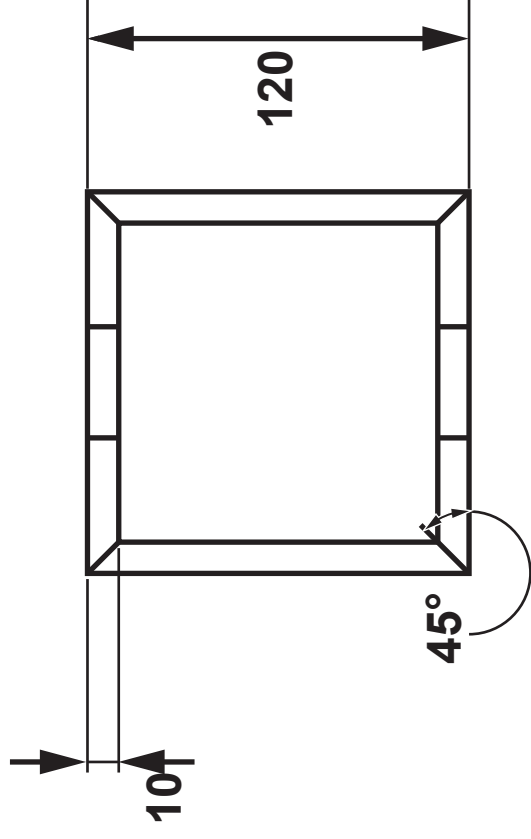
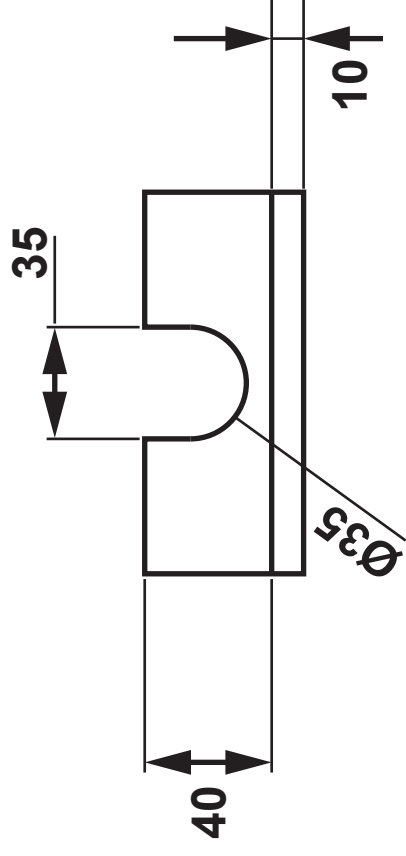
[4 marks]

(Turn over)

3 (b) Explain, using examples, why annotation is important when generating initial design ideas.

[4 marks]

Coaster holder



All measurements in mm



4. The four drinks coasters and holder opposite have been manufactured using bamboo.
- (a) Each drinks coaster is 100 mm × 100 mm × 10 mm. The bamboo is available in two different sizes:

Pre-cut to size: 100 mm × 100 mm × 10 mm
= £3.00 each

Bamboo Sheet: 520 mm × 520 mm × 10 mm
= £35 each

Calculate the difference in material cost when using one bamboo sheet compared to the pre-cut to size. [4 marks]

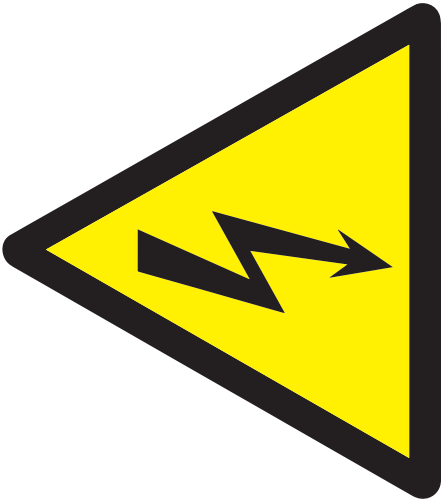
Show your workings.

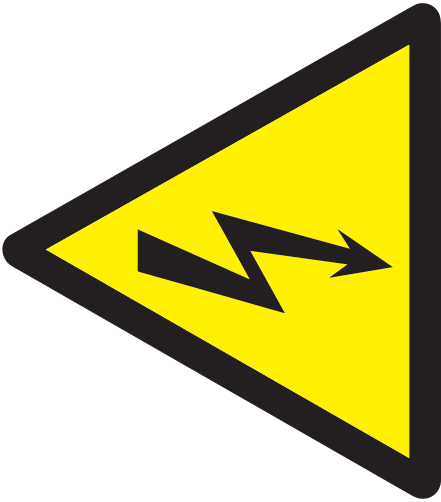
- 4 (b) On the next page, using the information provided, create a production flow chart including quality control for the manufacturing process of the coaster holder by hand in a school workshop.**
- [8 marks]**

5. A new bandsaw has been installed in a school's design and technology workshop.



- (a) Discuss the health and safety considerations that need to be in place before the bandsaw can be certified for use. [8 marks]

Sign 1	Sign 2
	



5 (b) State the meaning of the signs shown opposite and explain how they impact on the user.

2 × [2 marks]

Sign 1: _____

Sign 2: _____

(Turn over)



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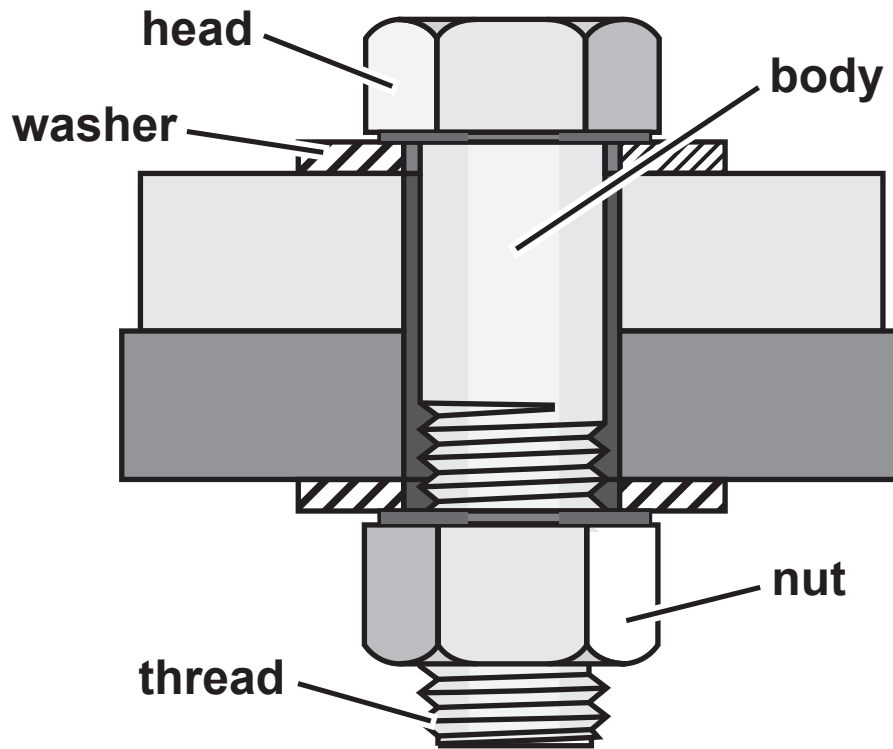
- 6. Computer-integrated manufacturing (CIM) is employed during high volume production such as the Lego bricks shown opposite.**

Evaluate the advantages and disadvantages to the manufacturer using computer-integrated manufacturing (CIM). [10 marks]

[illegible]

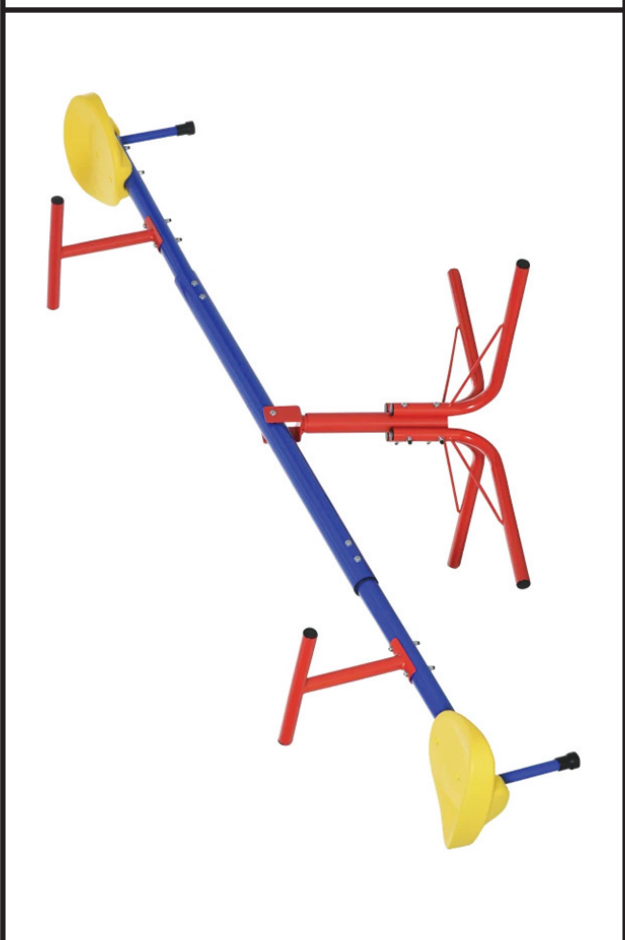
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7. Temporary fixings such as nuts and bolts are used to join materials together.



- (a) Explain the purpose of the washer when using nuts and bolts. [2 marks]

- (b) On the next page, using notes and sketches explain the metal stamping process used to manufacture flat washers. [6 marks]



8. The children's seesaw opposite has been manufactured using metals supplied in stock form.

(a) Identify TWO different metal stock forms that have been used. [2 marks]

Stock form 1: _____

Stock form 2: _____

(b) Explain why plastic coating is an appropriate finish for the children's seesaw. [6 marks]

9. A manufacturer of aerospace parts is considering two different locations for a new manufacturing site, one in the United Kingdom and one in an economically developing country.

Discuss the important factors the manufacturer should consider when deciding on the location of the new manufacturing site. [8 marks]

10. The Right to Repair Regulations, 2021 was introduced to increase producer responsibility and give customers the right to repair products.

Analyse the impact of this on the development of new products. [10 marks]

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

END OF PAPER

(Turn over)

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

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