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|---------------|---------------|------------------|
| Surname       | Centre Number | Candidate Number |
| First name(s) |               | 2                |



**GCE A LEVEL**

1603U30-1



**MONDAY, 2 JUNE 2025 – MORNING**

**DESIGN AND TECHNOLOGY – A2 unit 3**

**Product Design**

2 hours 30 minutes

| 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           |              |
| <b>Total</b>            | <b>100</b>   |              |

#### 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(s) 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.

The total number of marks available is 100.

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

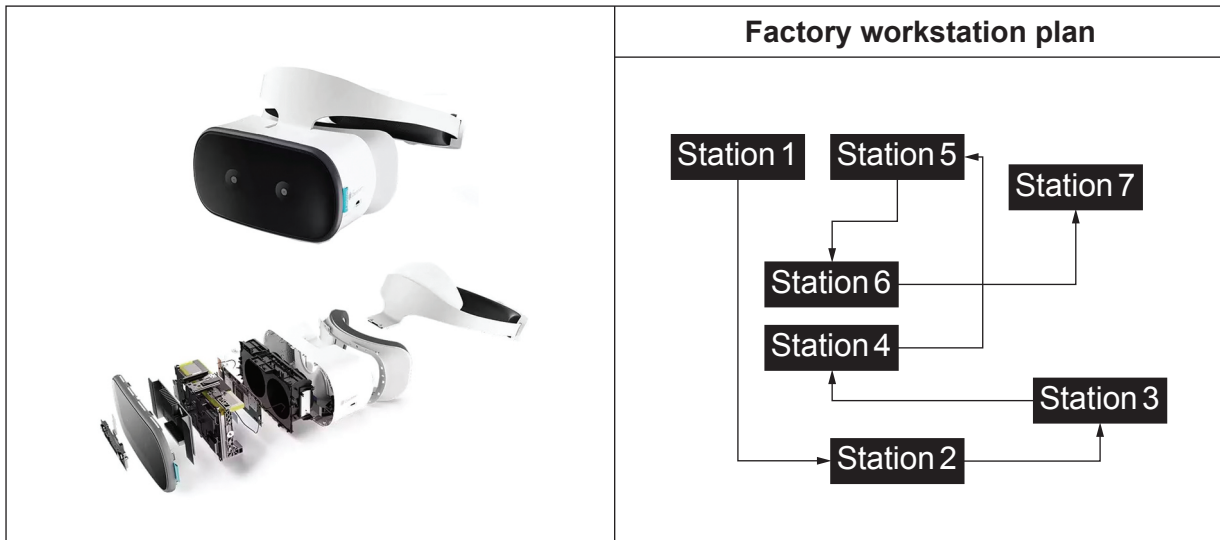
The quality of your written communication, including appropriate use of punctuation and grammar, will be assessed in your answer to question **10**.



JUN251603U30101

Answer **all** questions.

1. The virtual reality (VR) headset below 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. Sketch a new factory workstation plan that utilises cell production. [2]

New factory workstation plan



- (b) Explain how cell production would benefit the manufacturer.

[4]

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- (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]

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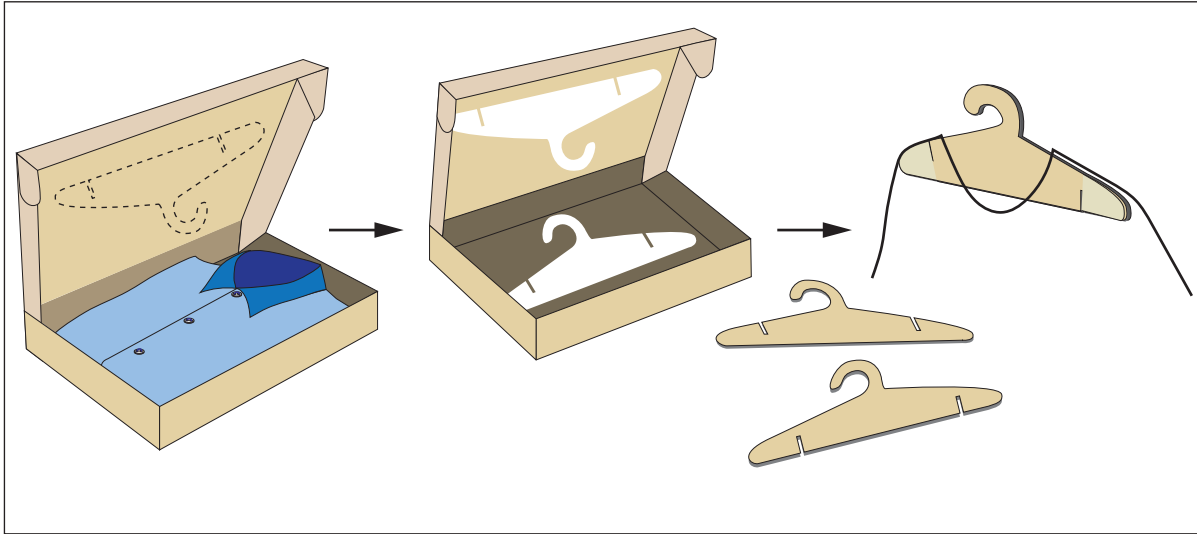
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2. The cardboard packaging being developed below includes clothes hangers.



- (a) Describe the environmental impact of the cardboard packaging.

[2]

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

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]

- (c) Explain the key stages to successfully laser cut the CAD drawing of the packaging net.

[4]

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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]

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- (b) Explain, using examples, why annotation is important when generating initial design ideas. [4]

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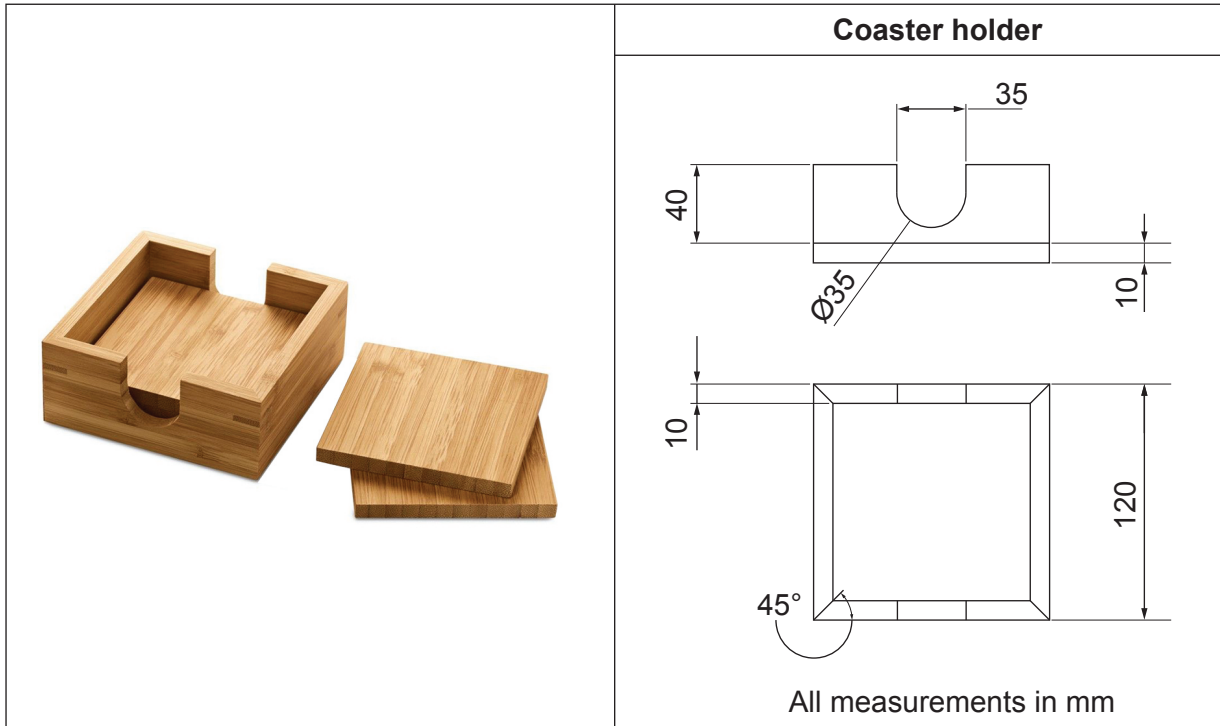


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4. The four drinks coasters and holder below have been manufactured using bamboo.



- (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]

Show your workings.

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- (b) 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]



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]

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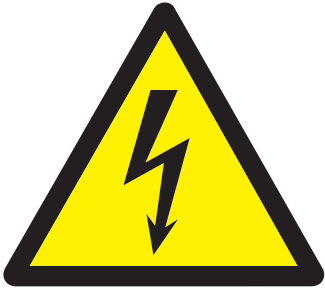
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- (b) State the meaning of the signs shown below and explain how they impact on the user.  
2 × [2]

| Sign 1                                                                            | Sign 2                                                                             |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
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Sign 1: .....

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Sign 2: .....

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[10]



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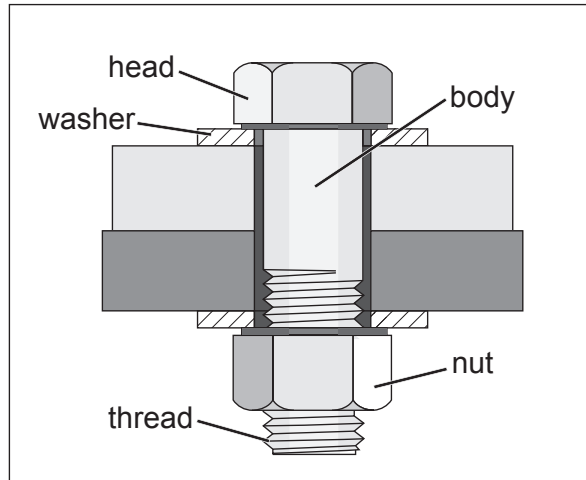
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7. Temporary fixings such as nuts and bolts are used to join materials together.



- (a) Explain the purpose of the washer when using nuts and bolts.

[2]

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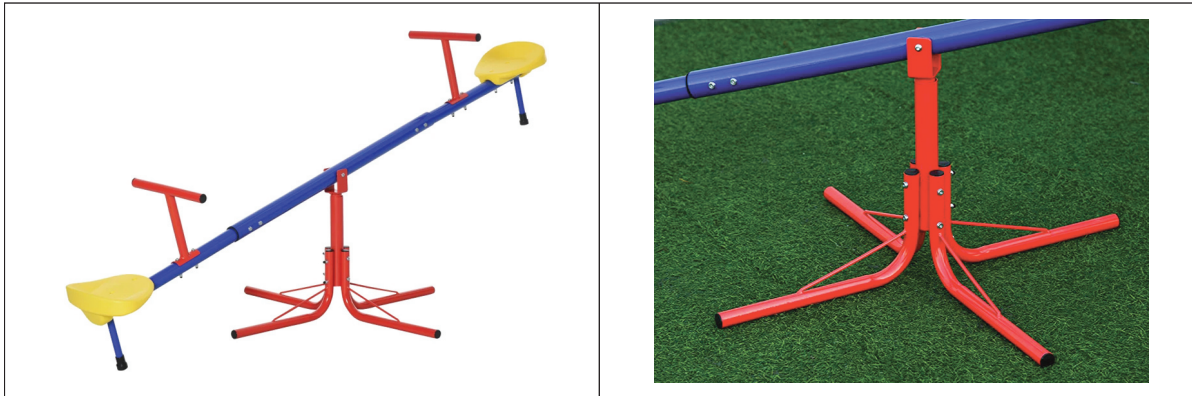
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- (b) Using notes and sketches explain the metal stamping process used to manufacture flat washers.

[6]



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



- (a) Identify **two** different metal stock forms that have been used. [2]

Stock form 1: .....

Stock form 2: .....

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

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



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



[illegible]

[illegible]

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