FOR OFFICIAL USE

N5

National Qualifications 2023

Mark

X819/75/01 Design and Manufacture

TUESDAY, 30 MAY

1:30 PM — 3:15 PM

X8197501

Fill in these boxes and read what is printed below.

Full name of centre

Town

Forename(s)

Surname

Number of seat

Date of birth

Day | Month | Year

Scottish candidate number

Total marks — 80

SECTION 1 — 60 marks

Attempt ALL questions.

SECTION 2 — 20 marks

Attempt ALL questions.

Write your answers clearly in the spaces provided in this booklet. Additional space for answers is provided at the end of this booklet. If you use this space you must clearly identify the question number you are attempting.

Use **blue** or **black** ink.

Before leaving the examination room you must give this booklet to the Invigilator; if you do not, you may lose all the marks for this paper.

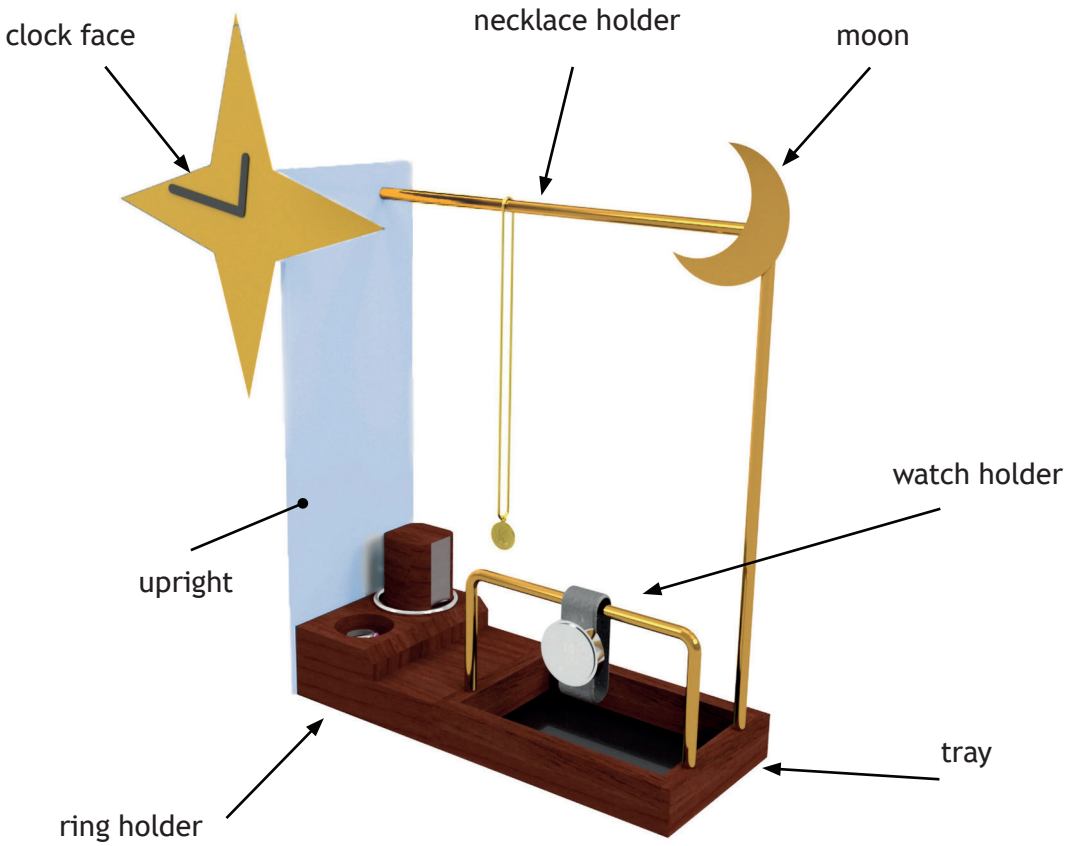
SQA ©

X819750101

SECTION 1 — 60 marks

Attempt ALL questions

1. A design proposal for a jewellery organiser is shown below.



(a) The ring holder and tray were manufactured from a stained softwood.

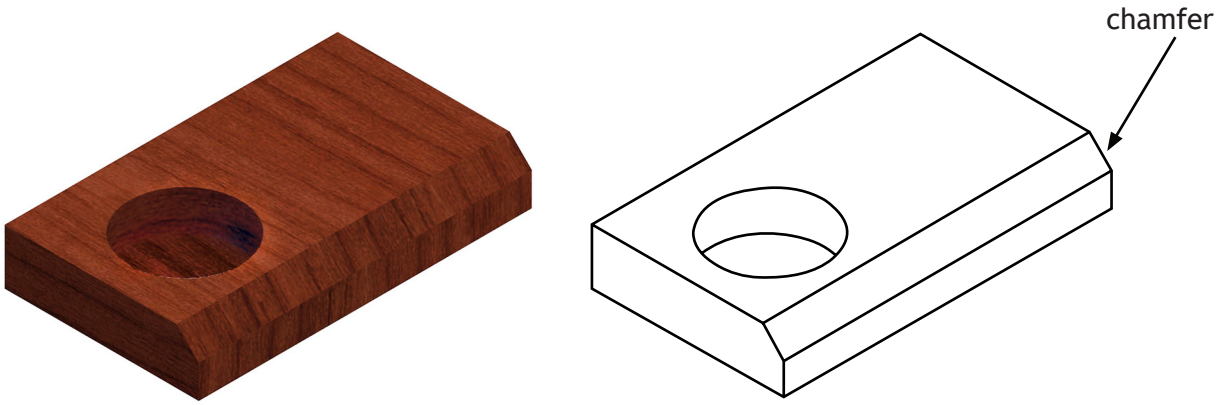
(i) Name a suitable softwood for the ring holder and tray. **1**

A flat-bottomed hole was drilled into the ring holder to store rings.

(ii) Name the suitable drill bit that could be used to drill a flat-bottomed hole. **1**

1. **(continued)**

The edge of the ring holder was chamfered.



(iii) Name the suitable hand tool that could be used to create the chamfer. **1**

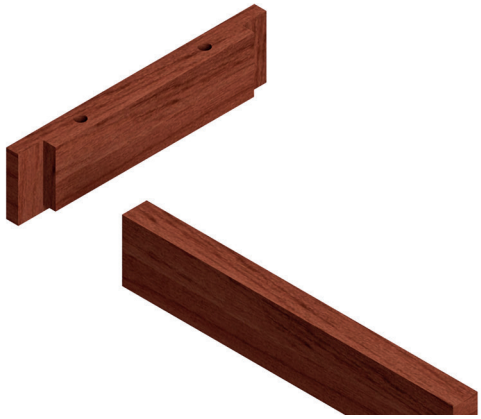
_____

_____

[Turn over

1. (continued)

(b) The tray was manufactured using a corner rebate joint.



(i) Describe how the corner rebate joint could be marked **and** cut out accurately. You must refer to workshop tools in your answer. **4**

You may use sketches to illustrate your answer in the box below.

1. (b) (continued)

(ii) Name another suitable joint that could be used for the corners of the tray. **1**

The tray was checked for squareness during assembly.

(iii) Outline **two** methods of checking the frame is square. **2**

You may use sketches to illustrate your answer in the box below.

The softwood tray was assembled using an adhesive.

(iv) Name the appropriate adhesive for assembling the softwood tray. **1**

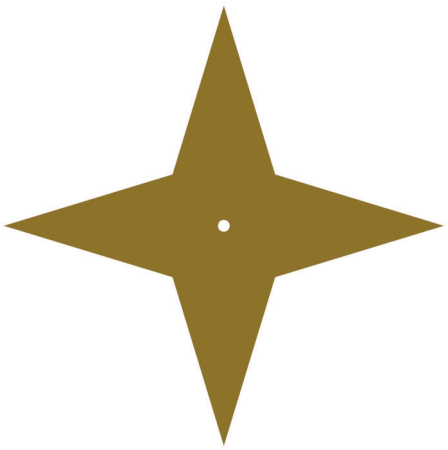
[Turn over

1. (b) **(continued)**

All wooden components were prepared for a stained finish.

(v) Describe **three** stages in the preparation of the wooden components before applying stain. **3**

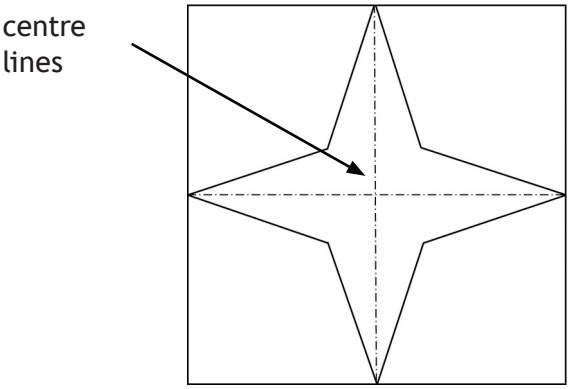
(c) The clock face was made from brass.



(i) State **two** reasons why brass is a suitable material for the clock face. **2**

1. (c) (continued)

The brass clock face was marked out as shown below.



(ii) Describe how to mark out the centre lines of the clock face, with reference to workshop tools. **2**

You may use sketches to illustrate your answer in the box below.

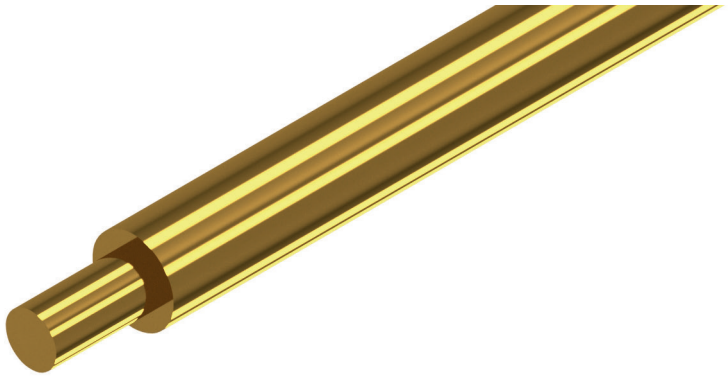
A hand tool was used to cut out the star shape.

(iii) Name an appropriate hand tool that could be used to cut out the star. **1**

[Turn over

1. **(continued)**

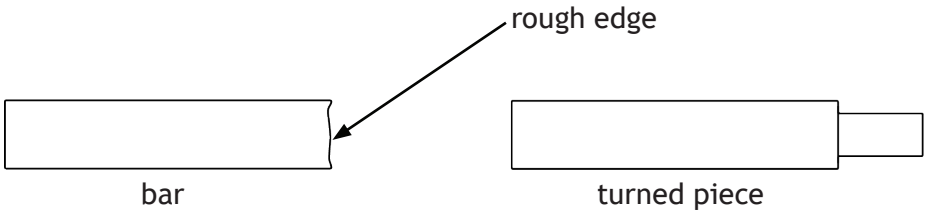
(d) The ends of the necklace hanger were turned on a centre lathe as shown below.



(i) Outline **two** safety checks that must be carried out on the centre lathe **before** turning. **2**

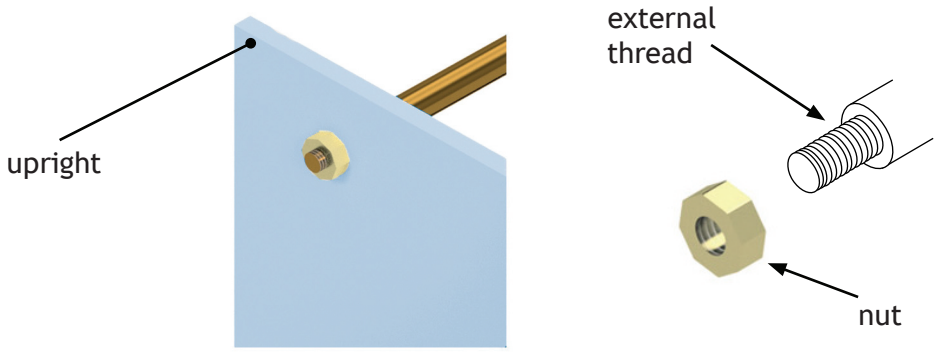
1. (d) **(continued)**

The bar was supplied as shown below.



(ii) Name **two** processes that would be carried out on the centre lathe to create the turned piece. **2**

An external thread was cut on the end of the bar to allow it to be attached to the upright using a nut.

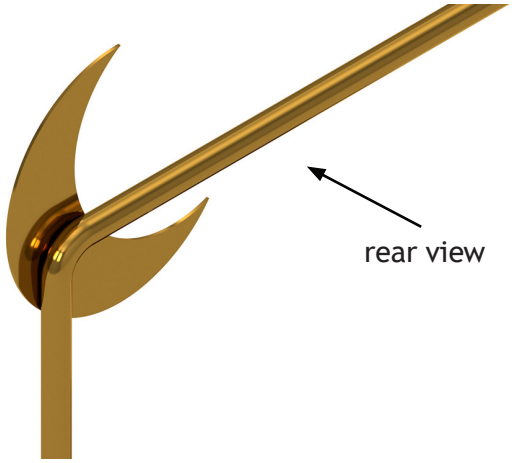


(iii) Describe **two** ways of ensuring a good quality thread is cut. **2**

[Turn over

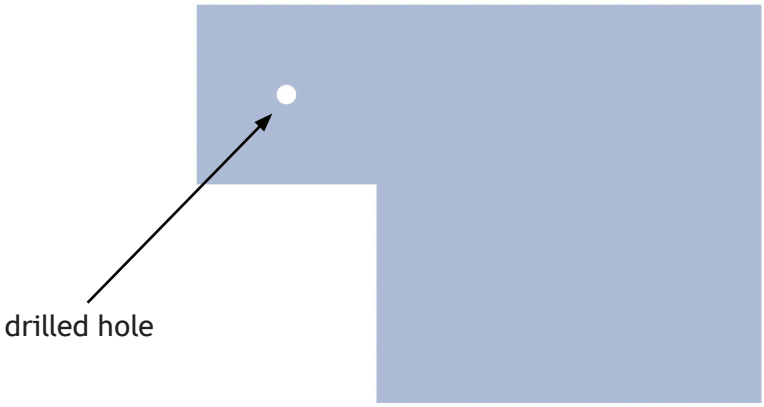
1. (d) (continued)

The brass moon was permanently joined to the brass bar.



(iv) Name a suitable adhesive for permanently joining the moon to the bar. **1**

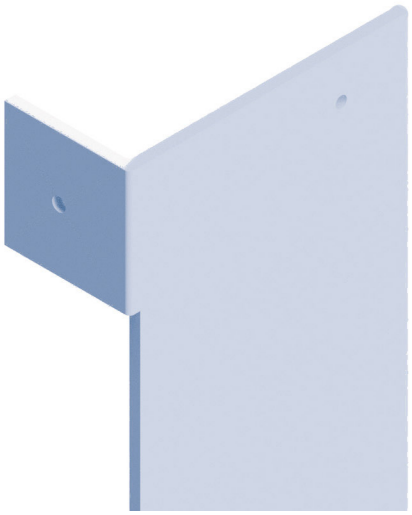
(e) A hole was drilled in the acrylic upright to allow the clock mechanism to be held.



(i) Outline **one** method of preventing the acrylic cracking during drilling. **1**

1. (e) **(continued)**

The upright was bent to a right angle as shown below.



(ii) Describe how the right-angled bend could be formed accurately, with reference to workshop tools. **2**

You may use sketches to illustrate your answer in the box below.

(iii) Explain why the hole was drilled in the upright before the bend was formed. **1**

MARKS | DO NOT WRITE IN THIS MARGIN

2. When carrying out research, a variety of methods can be used to gather information.

(a) Explain the benefits of using a questionnaire to gather information. **3**

After completing the research, a product specification can be produced.

(b) Describe how a specification can be used during the design process. **1**

MARKS | DO NOT WRITE IN THIS MARGIN

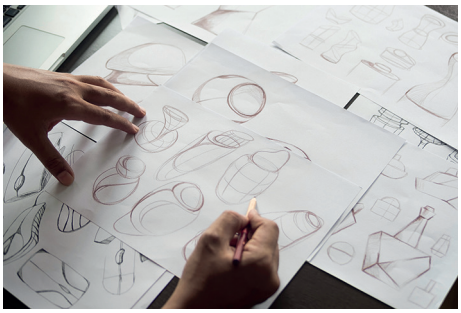
3. Brainstorming can be used as an idea generation technique.

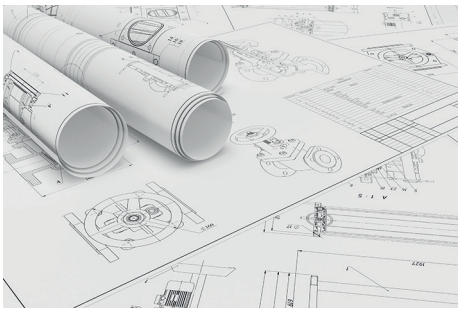
(a) Describe the key stages of brainstorming. **3**

(b) Name another idea generation technique. **1**

[Turn over

4. Designers use graphic techniques at different stages of the design process.





(a) Outline **two** reasons why sketching is a suitable graphic technique to use when generating ideas. **2**

(b) Outline **two** reasons why a designer will produce working drawings during the planning for manufacture stage. **2**

4. (continued)

During the design process designers can use computer generated and physical models.

(c) Explain the benefits of using physical models such as sketch, scale or block models during the design process. **3**

[Turn over

MARKS | DO NOT WRITE IN THIS MARGIN

5. A kettle is shown below.



Describe how ergonomics may have influenced the design of the kettle. **4**

6. A bicycle is shown below.



You must give different examples for (a) and (b).

Describe how the following design factors may have influenced the design of the bicycle:

(a) safety. **3**

(b) function. **3**

[Turn over

7. Three clocks are shown below.



Clock A



Clock B



Clock C

(a) Describe how the clocks **compare** aesthetically. **3**

*You should compare **three** different aesthetic aspects.*

MARKS | DO NOT WRITE IN THIS MARGIN

7. (continued)

Brand image is important to many companies.





(b) Describe **two** benefits of a strong brand image. **2**

_____

_____

_____

_____

_____

_____

[Turn over

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SECTION 2 — 20 marks

Attempt ALL questions

8. Two mass manufactured taps are shown below.

Metal Tap



Metals
• Mild steel
• Copper
• Iron

Plastic Tap



Plastics
• Acrylic
• Urea formaldehyde
• ABS

A different reason must be given for the suitability of each material.

(a) A metal tap is shown above.

(i) Name the most suitable metal from the list provided. **1**

_____

(ii) State why the metal you have selected would be suitable for the tap. **1**

_____

(b) A plastic tap is shown above.

(i) Name the most suitable plastic from the list provided. **1**

_____

(ii) State why the plastic you have selected would be suitable for the tap. **1**

_____

8. (continued)

Mass manufacturing processes were used to produce the taps.

You must give different responses in (c) and (d).

(c) State **two** identifying features that would show the plastic tap was injection moulded. **2**

(d) Outline **two** reasons why die casting is a suitable process for mass manufacturing the metal taps. **2**

[Turn over

8. (continued)

A thermoplastic water tank is shown below.



(e) Name an appropriate process to manufacture the thermoplastic water tank **and** state why it is suitable. **2**

Process _____

Suitable because _____

_____

_____

9. Computer Aided Manufacture (CAM) is often used in the mass-manufacture of products.



(a) Explain the benefits of CAM to the manufacturer. **3**

Not all products can be mass-manufactured.

(b) Explain why some products are not suitable for mass-manufacture. **1**

[Turn over

10. Manufacturers often use standard components such as the part shown below.



Outline the benefits of using standard components to the manufacturer. **3**

11. Manufacturers have a responsibility to reduce landfill waste by extending product life expectancy.



Outline **three** steps that manufacturers could take to extend the life expectancy of a product. **3**

[END OF QUESTION PAPER]

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ADDITIONAL SPACE FOR ANSWERS

MARKS | DO NOT WRITE IN THIS MARGIN

ADDITIONAL SPACE FOR ANSWERS

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