FOR OFFICIAL USE

N5

National Qualifications 2019

Mark

X819/75/01 Design and Manufacture

THURSDAY, 16 MAY
1:00 PM – 2:45 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.

Show all working and units where appropriate.

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

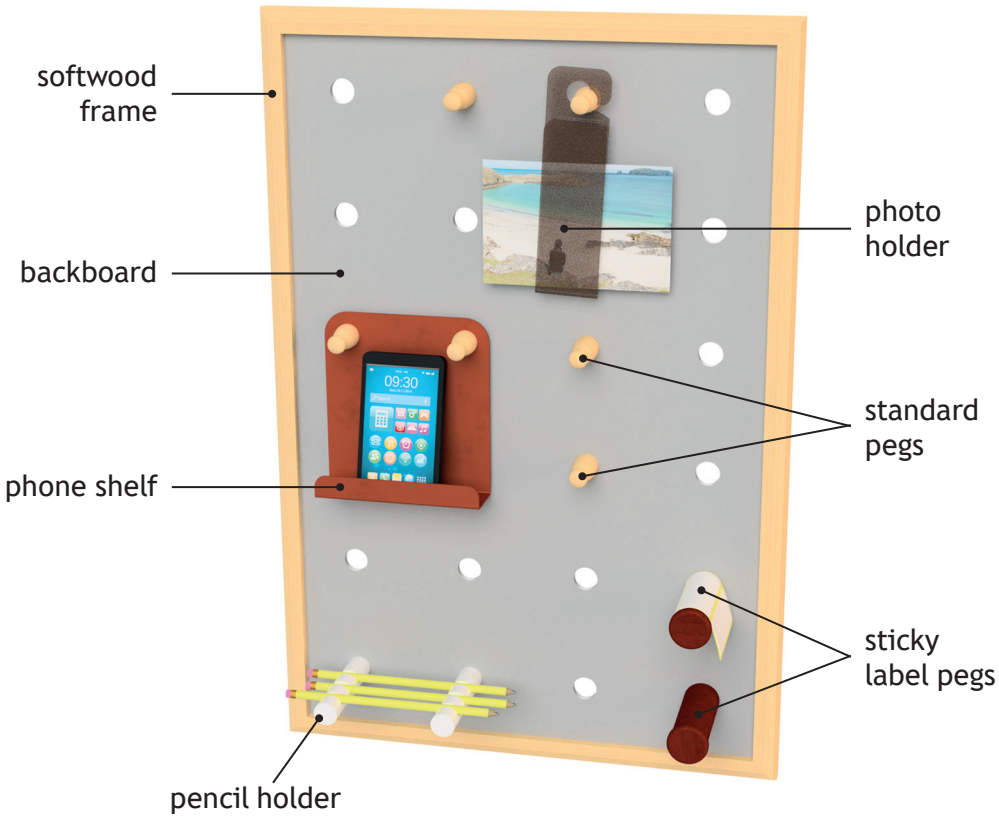
Before leaving the examination room you must give this booklet to the Invigilator; if you do not, you may lose all the marks for this paper.

SQA ©

X819750101

MARKS | DO NOT WRITE IN THIS MARGIN

1. A design proposal for a peg board and accessories is shown below.



(a) The standard pegs were made from hardwood.

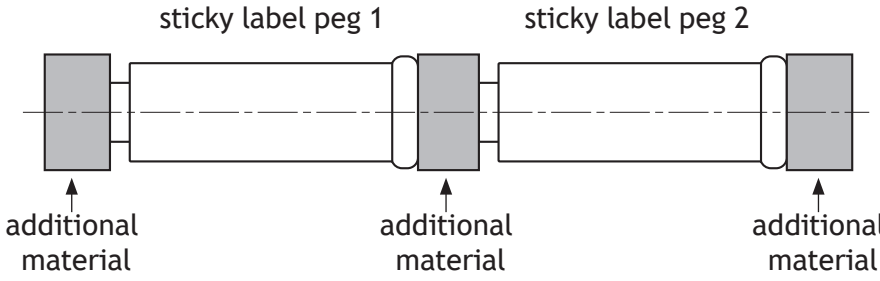
(i) Name a suitable light coloured hardwood for the standard peg. **1**

_____

MARKS

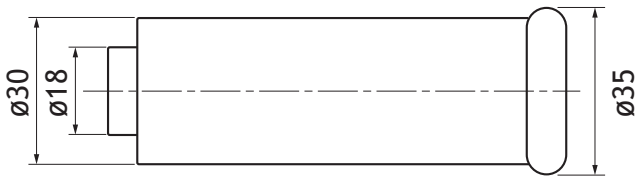
DO NOT WRITE IN THIS MARGIN

Two sticky label pegs were turned on the wood lathe from a single length of wood.



(ii) Outline **two** reasons why additional material is included on the length of wood. **2**

The sticky label pegs were turned to the sizes shown below.

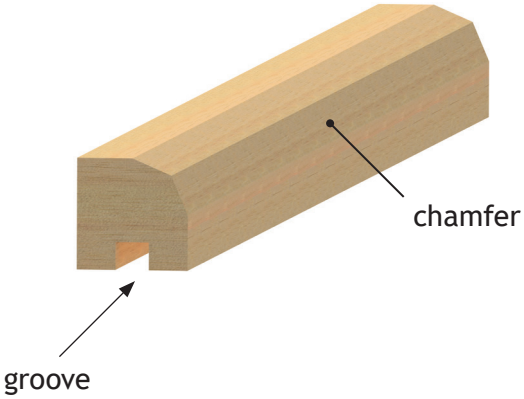


(iii) Name the lathe process carried out to reduce the diameter from 35 to 30mm. **1**

(iv) Name the hand tool that should be used to check that the diameters are the correct size. **1**

1. **(continued)**

(b) The four sides of the frame were cut from one length of wood and shaped as shown below.



(i) Complete the sequence of operations shown below by filling in the appropriate process and tools.

Step	Process	Tools
1	Mark lengths	Try-square, rule, pencil
2	Mark chamfer	
3		Plough plane
4	Cut chamfer	
5	Cut lengths	

4

(ii) Explain why Step 4 was carried out before Step 5 in the table above. 1

_____

_____

1. (b) (continued)

The frame was checked for squareness during assembly.

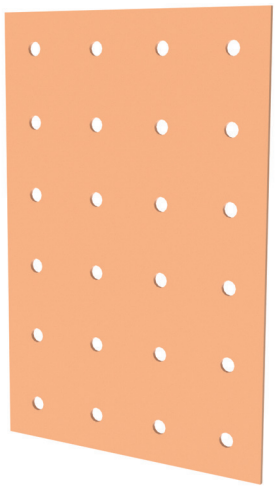
(iii) Describe **two** methods of checking the frame is square. **2**

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

[Turn over

1. (continued)

(c) MDF was used to make the backboard.



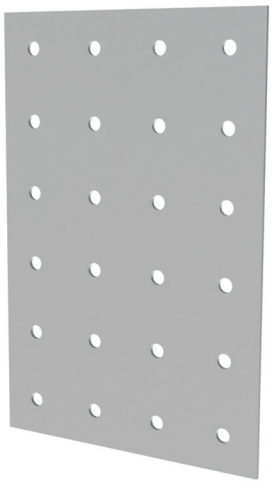
(i) State **two** reasons why MDF is a suitable choice of material for the backboard. **2**

A pillar drill was used to create the holes.

(ii) State **two** safety checks that must be carried out on the pillar drill before use. **2**

1. (c) (continued)

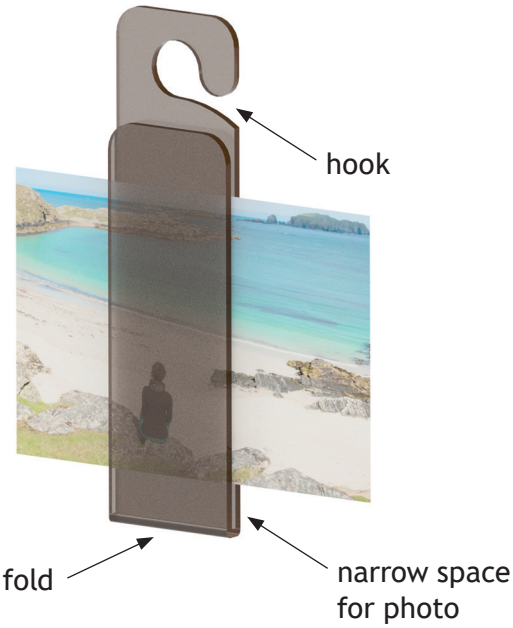
Grey paint was applied to the surface of the backboard.



(iii) Describe **three** ways to ensure a high quality paint finish. **3**

1. **(continued)**

(d) A photo holder was made from thermoplastic sheet.



The thermoplastic sheet was marked out and folded to securely hold a photo.

Describe how the photo holder would have been folded into shape, with reference to workshop tools and equipment. **2**

1. (continued)

(e) The phone shelf was made from copper sheet.

(i) State **two** reasons why copper is a suitable choice of material for the phone shelf. **2**

_____

_____

_____

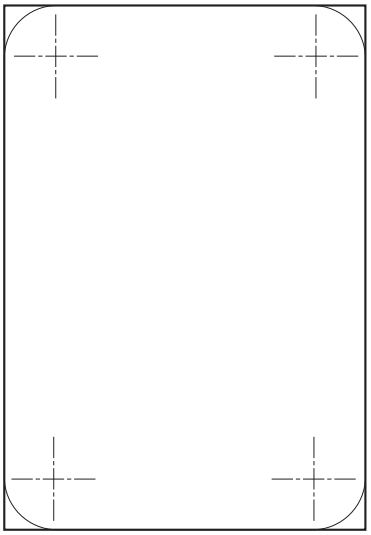
_____

[Turn over

MARKS

DO NOT WRITE IN THIS MARGIN

The phone shelf corners were marked out on a sheet of copper as shown below.



(ii) Describe how to mark out the corners, with reference to workshop tools.

You may use sketches to illustrate your answer in the box below. **3**

1. (e) (continued)

(iii) Describe how to cut **and** shape the corners, with reference to workshop tools. **2**

(iv) Describe how to form the 90° bends, with reference to workshop tools. **2**

[Turn over

2. A company that manufactures kitchen appliances wishes to add a toaster to their range.

(a) The designer used a questionnaire to research existing toasters.

(i) Describe the key stages of a questionnaire. **3**

(ii) Name an alternative research technique which the designer may have used. **1**

2. (continued)

The designer produced a product specification after completing the research.

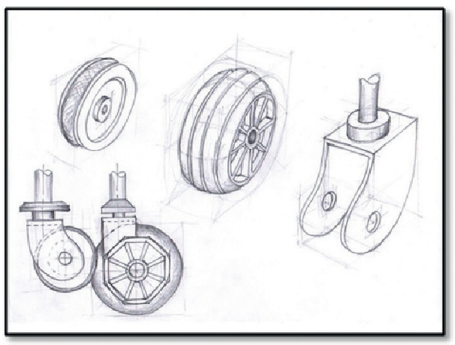
(b) Explain why a specification is used during the design process. **1**

The designer used brainstorming as an idea generation technique.

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

[Turn over

3. A range of graphic techniques were used throughout the design of the trolley wheel shown below.



(a) Sketches were used at the initial ideas stage.

State **two** reasons why this graphic technique is appropriate. **2**

(b) During the planning for manufacture stage, the designer would produce working drawings.

State **two** reasons why working drawings are required. **2**

4. Models are often used during the design process.

Explain why models may be used during the design process. **3**

[Turn over

5. An iron and ironing board are shown below.

You must give different examples in (a), (b) and (c).

(a) Describe how ergonomics may have influenced the design of the iron and/or the ironing board. **4**

5. (continued)

(b) Describe how function may have influenced the design of the iron and/or the ironing board. **2**

(c) Describe how safety may have influenced the design of the iron and/or the ironing board. **2**

[Turn over

6. A portable speaker is shown below.

(a) Describe **three** aesthetic aspects of the speaker. **3**

The company developing the speaker has a strong brand image.

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

Marketing techniques can be used to influence sales.

(c) Name **two** marketing techniques that the company could use to promote the speaker. **2**

SECTION 2 — 20 marks

Attempt ALL questions

7. The dumbbell and stand shown below have been produced using a range of metals and processes.

weight plate

metals
- aluminium
- mild steel
- brass
- iron
- copper

stand

(a) Select appropriate metals for the weight plate and stand from the list provided **and** explain why they would be suitable.

You must give a different metal and explanation for each item.

(i) Weight plate. **2**

Metal _____

Suitable because _____

_____

(ii) Stand. **2**

Metal _____

Suitable because _____

_____

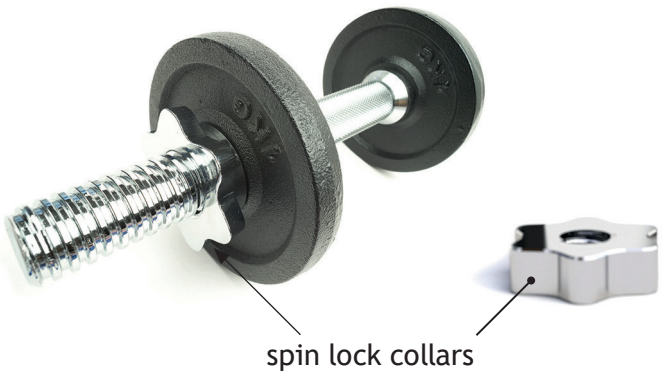
[Turn over

7. (continued)

(b) The weight plates have been sand cast.

Describe **two** identifying features that would show the weight plates have been sand cast. **2**

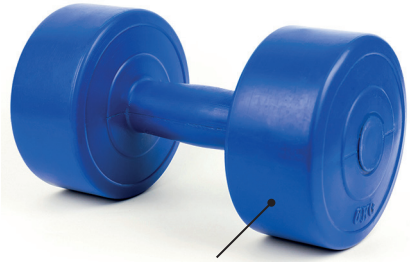
(c) The spin lock collars have been die cast.



Explain why die casting was used to manufacture the spin lock collars. **2**

7. (continued)

(d) A concrete filled dumbbell is shown below.



Name a suitable process to manufacture the thermoplastic casing of the dumbbell **and** explain why it is suitable. **2**

Process _____

Suitable because _____

_____

[Turn over

8. Many products are mass manufactured.

(a) Describe the impact of mass manufacturing on society. **3**

Not all products are mass manufactured.

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

9. Manufacturers often use standard components in the production of products.
Outline the possible benefits of using standard components. **2**

10. Manufacturers have a responsibility to reduce the damage they cause to the environment.

Outline the steps that a manufacturer could take to reduce their impact on the environment. **4**

[END OF QUESTION PAPER]

MARKS | DO NOT WRITE IN THIS MARGIN

ADDITIONAL SPACE FOR ANSWERS

MARKS | DO NOT WRITE IN THIS MARGIN

ADDITIONAL SPACE FOR ANSWERS

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Question 2	Kim Reinick/shutterstock.com
Question 3	Shopping trolley – Ints Vikmanis/shutterstock.com
Question 5	Ironing board – Stokkete/shutterstock.com
	Steam iron – Vladyslav Starozhylov/shutterstock.com
Question 6	Adtapon Duangnim/shutterstock.com
Question 7(a)	Dumbbell with extra weights – Chiari Vfx/shutterstock.com
	Dumbbell rack – Image of Hardcastle Vertical White Dumbbell Rack is taken from www.hardcastlebodybuilding.com. Reproduced by kind permission of Hardcastle Bodybuilding.
Question 7(b)	Dumbbell plate – Marekuliasz/shutterstock.com
Question 7(c)	Metal dumbbell – Ruphoto/shutterstock.com
Question 7(d)	Plastic coated dumbbell – Infinity T29/shutterstock.com
Question 10	Imagine Photographer/shutterstock.com