FOR OFFICIAL USE

N5

National Qualifications 2018

Mark

X819/75/01 Design and Manufacture

FRIDAY, 18 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.

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 ©

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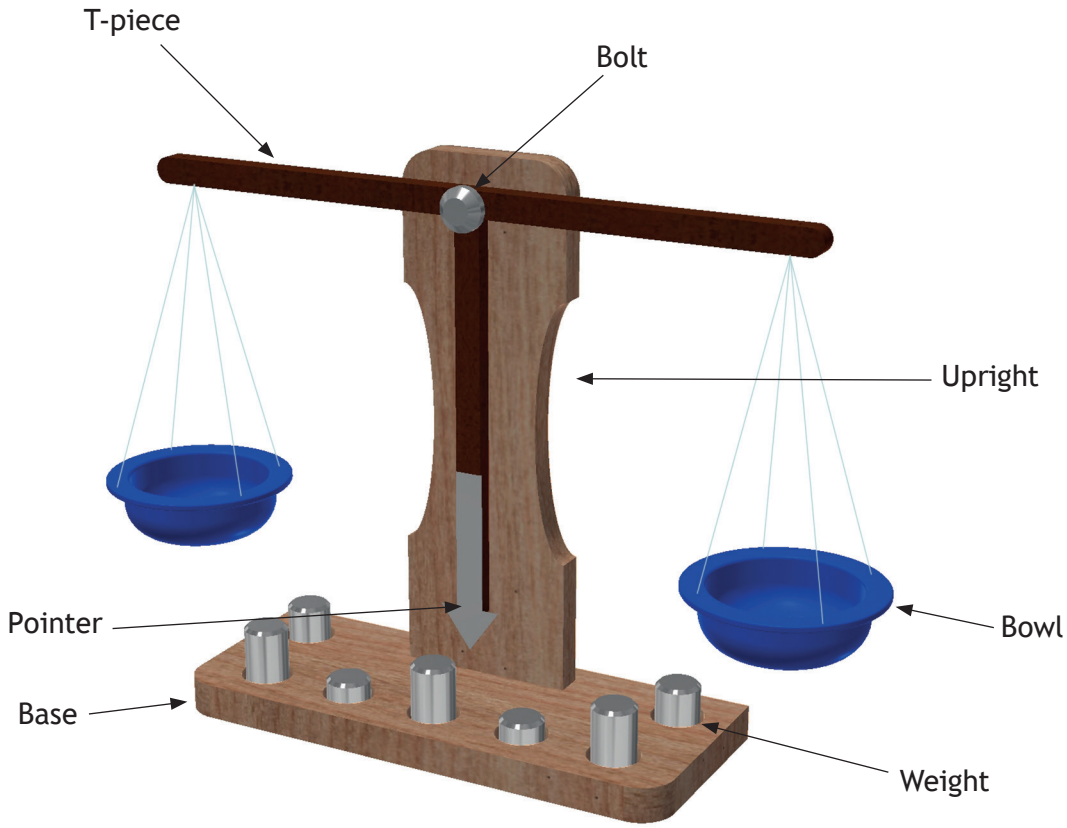
SECTION 1 — 60 MARKS

Attempt ALL questions

1. A design proposal for a set of educational scales is shown below.



(a) Red pine was used in the manufacture of the base and upright.

(i) Name an alternative softwood that could be used. **1**

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1. (a) (continued)

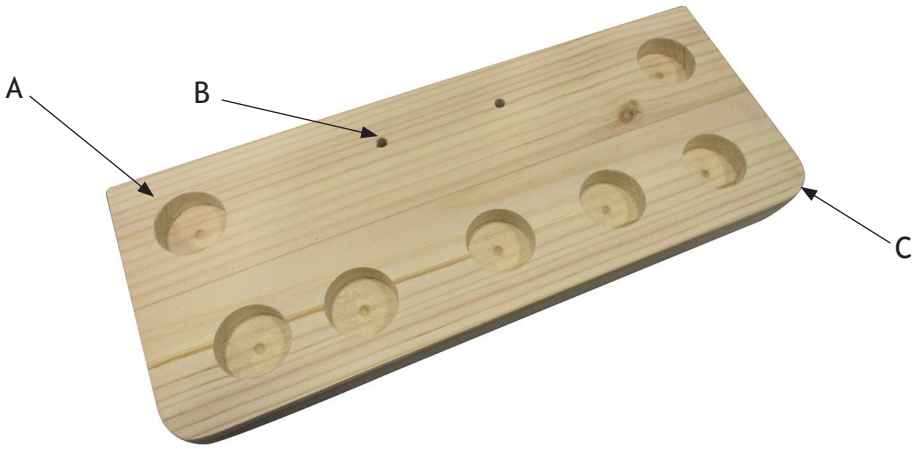
(ii) Two pieces of softwood were joined together to make the base.

Describe how to join the pieces of softwood together. You must refer to workshop tools in your answer.

(*Sketches may be used to illustrate your answer in the box below.*) **2**

1. **(continued)**

(b) The finished base is shown below.



(i) Name the type of drill bit that should be used to create the flat-bottomed hole at A. **1**

(ii) Name the type of drill bit that should be used to create the hole at B. **1**

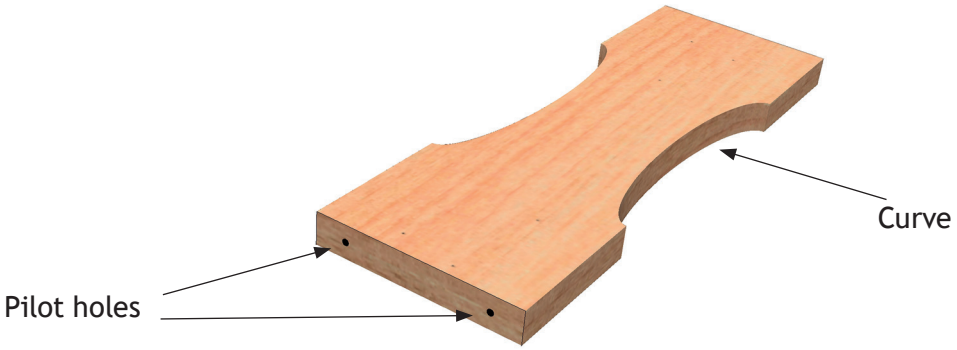
(iii) Name a machine that could be used to form the curve at C. **1**

(iv) The holes on the underside of the base were countersunk.

State why the holes were countersunk. **1**

1. (continued)

(c) The upright is shown below.



Pilot holes were made and curves cut in the upright before it was screwed to the base.

(i) Name the hand tool that should be used to create the pilot holes. **1**

(ii) Name a hand tool that could be used to cut the curves. **1**

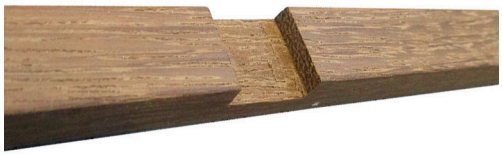
The upright and base were finished with wax instead of varnish.

(iii) Explain why wax would have been used instead of varnish. **2**

[Turn over

1. (continued)

(d) A housing was used in the manufacture of the T-piece.

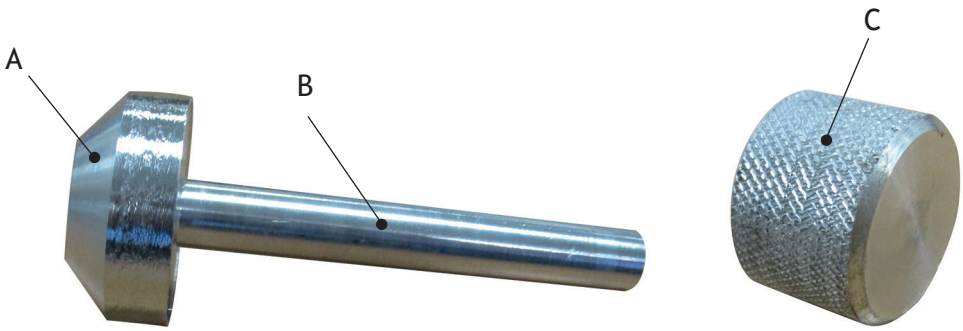


Describe how the housing could be marked and cut out accurately. You must refer to workshop tools in your answer.

(*Sketches may be used to illustrate your answer in the box below.*) **4**

1. (continued)

(e) The bolt and weight were created on a centre lathe.



(i) Name the processes that would be carried out on a centre lathe to create the features at A, B and C. **3**

A

B

C

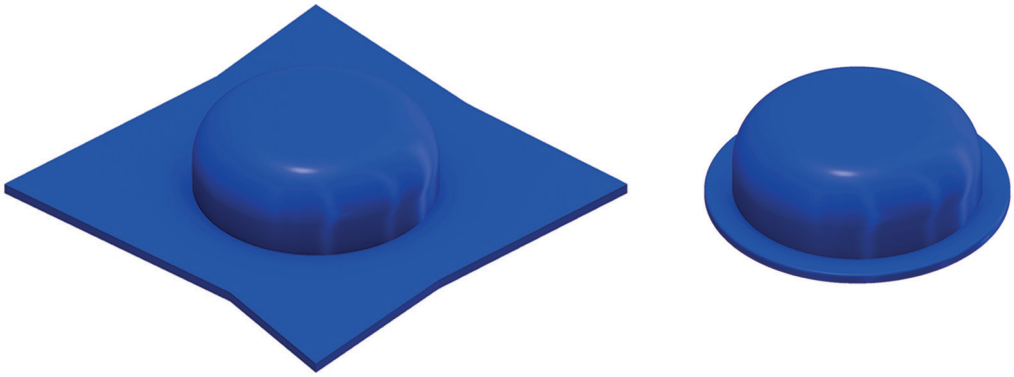
(ii) Having created features A and B, adjustments were made to the centre lathe to create feature C.

State **two** adjustments that would need to be made to the centre lathe to create the textured feature on part C. **2**

[Turn over

1. **(continued)**

(f) The bowls were made from a square piece of acrylic sheet using a former and then cut to shape.



(i) Explain why a former would be used to create the acrylic bowls. **2**

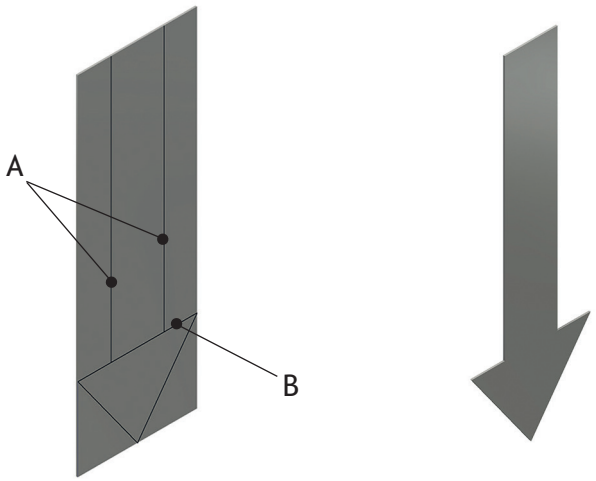
(ii) Name the piece of equipment that would be used to heat the acrylic before it is formed. **1**

(iii) Name a machine tool that could be used to cut out the circular shape. **1**

(iv) Describe how the edge of the acrylic would be finished after sawing. **2**

1. (continued)

(g) The pointer was made from a piece of sheet metal.



(i) Name a suitable silver-coloured, non-ferrous metal that could be used for the pointer. **1**

(ii) Name the tool that should be used to mark the two parallel lines at A. **1**

(iii) Name the tool that should be used with a scriber to mark the line B at a 90 degree angle to A. **1**

(iv) Name a hand tool that could be used to cut out the shape of the pointer. **1**

[Turn over

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2. A variety of techniques can be used to gather information.

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

(b) The information gathered from questionnaires can be used in the development of a specification.

Describe how the specification can be used during the development of a design proposal. **2**

3. Morphological analysis is often used to generate ideas.

(a) Describe the key stages of morphological analysis. **3**

3. (continued)

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

4. Computer generated graphics are often used during the development of products.

Describe **three** benefits of using computer generated graphics during the development of products. **3**

[Turn over

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5. Modelling techniques were used during the design of the blender shown below.

Explain the reasons for using the following modelling techniques when developing the blender:

(*Different reasons must be given for each technique.*)

(a) A sketch model. **2**

(b) A full-scale model. **2**

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6. The backpacks shown below were designed for two different target markets.

Backpack A

Hill walkers

Backpack B

Children

(a) Describe how the function and aesthetics of the backpacks have been influenced by their target markets.

(*You may refer to one or both of the backpacks in your answer.*)

(i) Function. **2**

(ii) Aesthetics. **2**

6. (continued)

(b) To ensure the backpacks were commercially successful the design team employed marketing techniques.

State **two** marketing techniques that could be used to improve sales. **2**

7. A child's camera is shown below.

(a) Describe how ergonomics may have influenced the design of the child's camera. **4**

7. (continued)

(b) Describe how performance may have influenced the design of the child's camera. **2**

(c) The design of products such as cameras has evolved over the years because of technology push.

Describe what is meant by technology push. **2**

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SECTION 2 — 20 MARKS

Attempt ALL questions

8. The handle of a craft knife and its packaging have been mass produced using different materials and processes.

(a) Identify a thermoplastic which could have been used in the production of each of the items below and explain why it would be suitable.

(*A different thermoplastic and explanation must be given for each item.*)

(i) Handle. **2**

Thermoplastic:

Suitable because

(ii) Packaging. **2**

Thermoplastic:

Suitable because

8. (continued)

(b) Name the process that would have been used to manufacture the:

(i) Handle. **1**

(ii) Packaging. **1**

(c) Die casting can be used to manufacture products or component parts.

State **two** features that would clearly identify that parts A and B have been die cast. **2**

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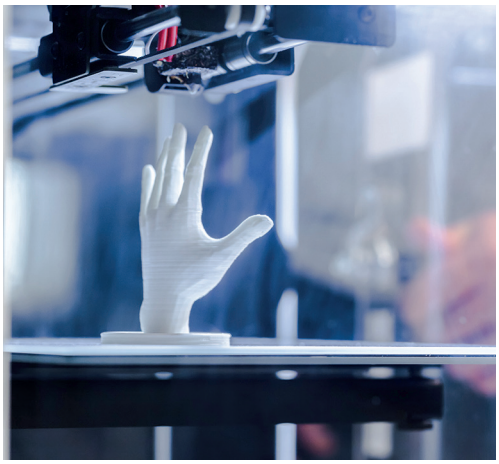
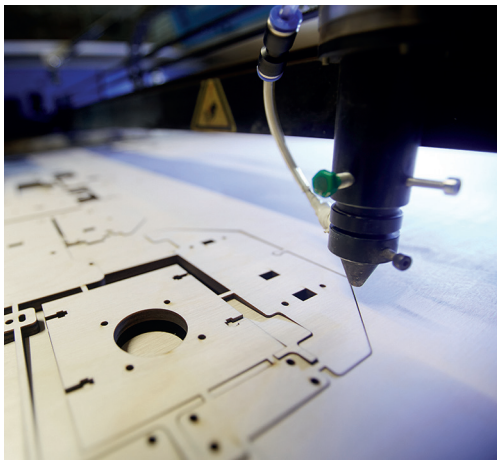
9. 3D printers and laser cutters are widely used in the design and manufacture of products.





(a) Describe the benefits of using 3D printers and laser cutters to design and mass produce products. **4**

(b) Describe the impact that the use of these technologies has had on society. **2**

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10. Products are being designed to be more sustainable.

Describe the steps designers and manufacturers can take to make products more sustainable. **3**

11. The bearings used in fidget spinners are standard components.

Describe the benefits of using standard components in products. **3**

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