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N5

National Qualifications 2015

Mark

X719/75/01

Design and Manufacture

MONDAY, 25 MAY
1:00 PM – 2:30 PM

X7197501

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 — 60

SECTION 1 — 24 marks

Attempt ALL questions.

SECTION 2 — 36 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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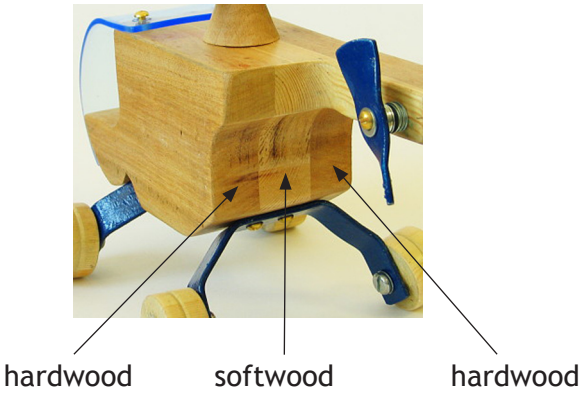
SECTION 1 — 24 MARKS

Attempt ALL questions

1. A design for a toy helicopter is shown below.

(a) The main body of the helicopter was manufactured by laminating two pieces of hardwood and one piece of softwood.



1. (a) (continued)

(i) The pieces of wood were glued together to form a strong, permanent join.

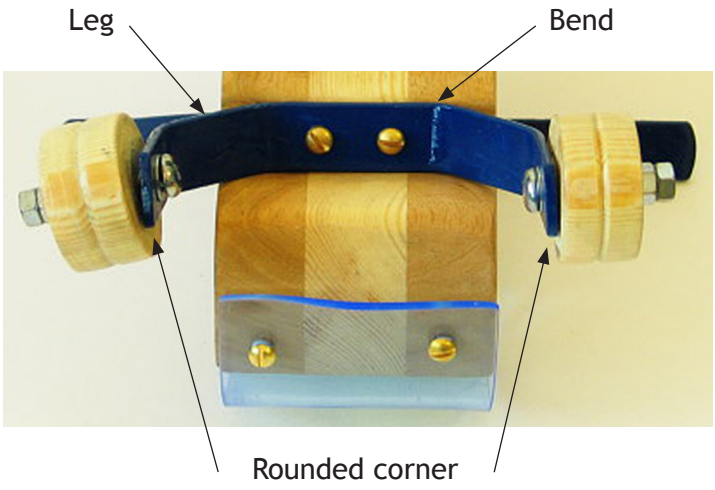
State **one** suitable piece of equipment that could have been used to hold the wood securely, during the drying of the glue. **1**

(ii) Describe **two** environmental considerations when selecting hardwood for the main body of the helicopter. **2**

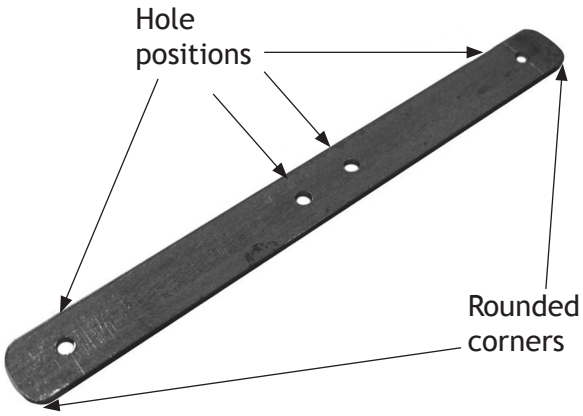
[Turn over

1. (continued)

(b) The legs on the underside of the helicopter are made from mild steel.



The legs were drilled and rounded before bending as shown below.

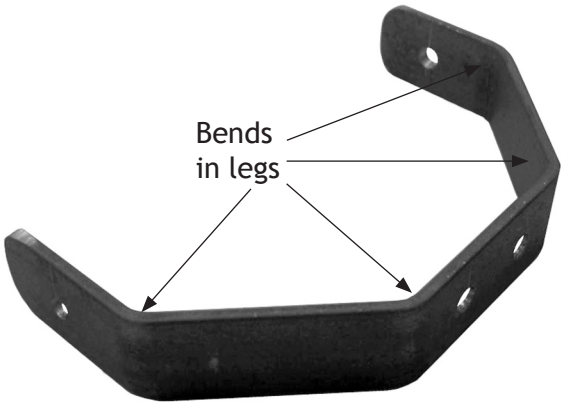


(i) Describe, with reference to appropriate tools, **two** stages in marking out the positions of the holes on the legs as shown above. **2**

1. (b) (continued)

(ii) Describe **two** stages required to shape the rounded corners on the legs. **2**

(iii) Describe **two** stages required to form the bends in the legs.



2

(iv) Describe how multiple sets of legs could be manufactured to be identical if the helicopter was batch produced. **1**

[Turn over

1. (b) (continued)

(v) Gloss paint was chosen as a suitable finish for the legs.

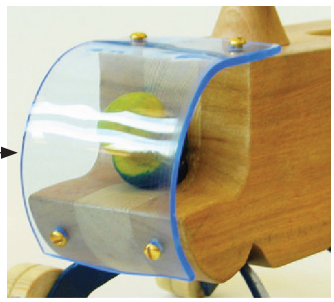
Describe **two** stages in the preparation of the metal before applying the paint. **2**

1. **(continued)**

(c) The windscreen of the helicopter is manufactured from acrylic sheet.

(i) State **two** properties of acrylic sheet that make it a suitable choice of material for the windscreen. **2**

(ii) After drilling, the windscreen was formed into a curve.



Describe **two** stages carried out during the process of forming the curve. **2**

1. (continued)

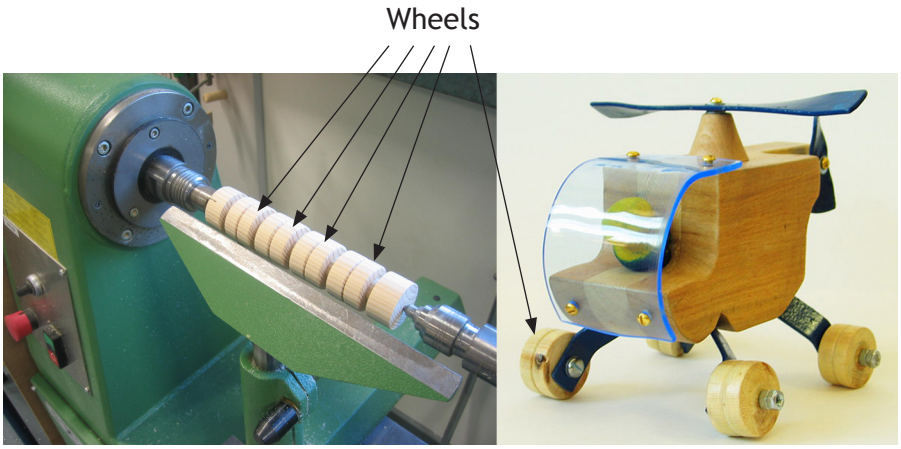
(d) The wooden wheels were turned on a woodturning lathe from a single piece of softwood.

(i) Describe **three** stages in preparing the softwood blank **before** fitting it on the woodturning lathe. Sketches may be used to illustrate your answer.

3

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

(ii) Describe **two** stages that could be carried out on the woodturning lathe to improve the surface finish on the four wheels.



2

(e) The target market for the helicopter is young children.

Describe **two** ways in which the helicopter could be made more appealing to the target market. **2**

(f) The helicopter has been designed to have a long lifespan.

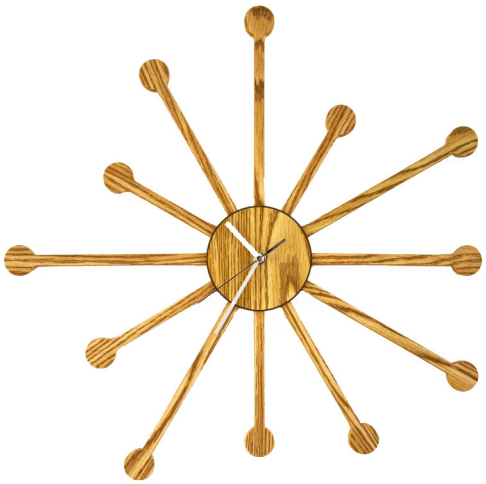
State **one** benefit to the environment of this design decision. **1**

MARKS DO NOT WRITE IN THIS MARGIN

SECTION 2 — 36 marks

Attempt ALL questions

2. Creative use of modern materials and manufacturing methods has made products like this clock easier to produce.



(a) The plywood components of the clock were manufactured using Computer Aided Manufacture (CAM).

(i) State **one** benefit to the manufacturer of using plywood for the clock. **1**

(ii) State the name of **one** suitable CAM method for cutting the plywood components of the clock. **1**

(iii) Describe **two** benefits to the manufacturer of using CAM. **2**

2. (continued)

(b) The clock is sold as a self-assembly kit.

Explain **two** quality assurance issues relating to self-assembly kits. **2**

[Turn over

MARKS | DO NOT WRITE IN THIS MARGIN

3. When designing hand held products similar to the dish brush shown below, the designer will use a range of techniques to reach the final design proposal.

(a) Idea generation techniques were used during the design of the dish brush.

(i) State the name of **two** idea generation techniques. **2**

_____

_____

(ii) Describe how **one** of your stated idea generation techniques would be carried out. **2**

(Sketches may be used to illustrate your answer).

_____

_____

_____

_____

3. (continued)

(b) To communicate the designs, a range of graphic techniques were used.

State the name of **one** graphic technique that the designer may use at each of the following stages of the design process **and** explain why it would be suitable.

(*a different graphic technique must be used for each stage*.)

(i) Development of ideas **2**

(ii) Communicating design proposal to client **2**

(c) Various models of the dish brush were produced.

(i) State **two** reasons why the designer would use models when designing the dish brush. **2**

(ii) State the name of a suitable modelling material that could be used to make a model of the dish brush handle. **1**

[Turn over

MARKS DO NOT WRITE IN THIS MARGIN

4. Aesthetics is an important factor in the design of the wireless headphones shown below.

Headphones A

Headphones B

Headphones C

(a) Describe the aesthetic qualities of the headphones. **3**

[*You may wish to refer to one, two or all of the headphones shown above*]

4. (continued)

(b) Anthropometrics is important in the design of headphones.

Describe **two** ways in which the design of headphones has been influenced by anthropometrics. **2**

(c) State **two** functional benefits of wireless headphones. **2**

[Turn over

MARKS DO NOT WRITE IN THIS MARGIN

5. A design team is developing a new scooter similar to the one shown below.

The market researcher in the design team plans to carry out a product evaluation.

(a) Describe a suitable test to evaluate the durability of the scooter. **2**

(b) Describe a suitable evaluation technique to find out if the scooter would be good value for money. **2**

5. (continued)

(c) A design specification is required for the scooter.

Write **one** specification statement for each of the following:

(i) Function **1**

(ii) Ease of maintenance **1**

(d) There are a number of members in a design team.

Describe the role of:

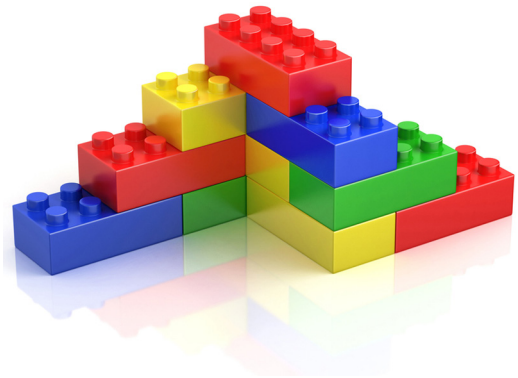
(i) The Engineer **1**

(ii) The Accountant **1**

[Turn over for Question 6 on *Page eighteen*

MARKS | DO NOT WRITE IN THIS MARGIN

6. Injection moulded plastic building blocks are shown below.



(a) State **two** initial set-up costs of injection moulding. **2**

_____

_____

(b) State **two** visual features that indicate a product has been injection moulded. **2**

_____

_____

[END OF QUESTION PAPER]

ADDITIONAL SPACE FOR ANSWERS

MARKS DO NOT WRITE IN THIS MARGIN

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