FOR OFFICIAL USE

N5

National Qualifications 2014

Mark

X719/75/01 Design and Manufacture

TUESDAY, 27 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

D D M M Y Y

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.

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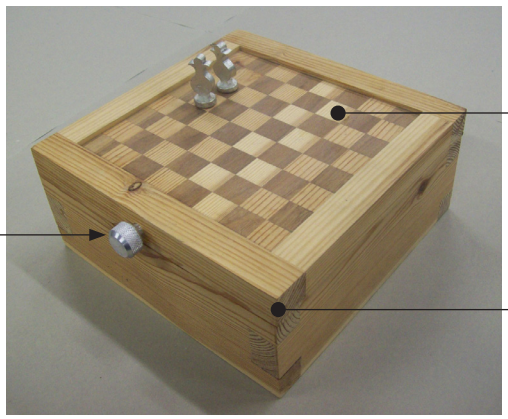
MARKS DO NOT WRITE IN THIS MARGIN

SECTION 1 — 24 marks

Attempt ALL questions

1. A chess box is shown below.



(a) Hardwood was used for some of the squares of the chess board.

(i) State the name of a hardwood that could have been used for the squares. **1**

(ii) Describe **two** benefits of using hardwoods for the manufacture of this product. **2**

(b) A comb joint has been used at each corner.

State the name of **two** alternative joints that could have been used at each corner. **2**

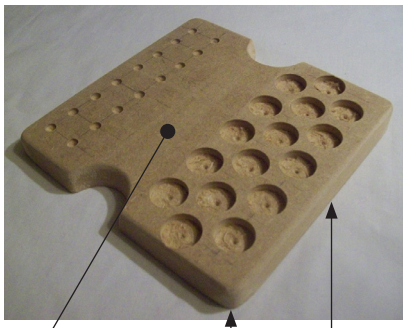
(c) Clear varnish was used as a surface finish for the chess box.

(i) Describe **two** benefits of using clear varnish as a surface finish for the chess box. **2**

1. (c) (continued)

(ii) Describe **two** stages in the preparation of the wood before applying the varnish. **2**

The plastic tray shown below was vacuum formed and is used to hold the chess pieces. The wooden pattern used in the process is also shown.



(d) Explain the reason for the following features in the wooden pattern.

(i) Rounded corners **1**

(ii) Sloping sides **1**

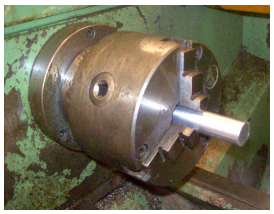
(iii) A thermoplastic was used for the tray.

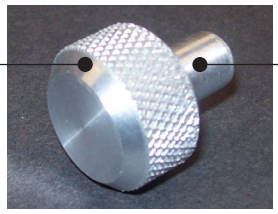
Describe **two** benefits of using a thermoplastic for this type of product. **2**

[Turn over

1. (continued)

(e) The aluminium handle shown below was manufactured using a centre lathe.





Describe how **each** of the following processes would be carried out on the centre lathe to manufacture the handle.

(i) Chamfering **2**

(ii) Parallel turning **2**

(iii) A change of speed may be required when using a centre lathe.

State **two** reasons why a change in lathe speed may be necessary. **2**

1. (continued)

(f) The aluminium chess pieces shown below were commercially produced by the process of die casting.

(i) State **two** reasons for using aluminium for the chess pieces. **2**

(ii) State **three** benefits of using die casting to manufacture the chess pieces. **3**

Total marks 24

[Turn over

MARKS DO NOT WRITE IN THIS MARGIN

SECTION 2 — 36 marks

Attempt ALL questions

2. The 2012 Olympic success of Team GB caused an increased interest in all forms of cycling for all ages.




(a) Describe how ergonomics has influenced the design of bicycles. **6**

2. (continued)

(b) Before producing a design specification for a bicycle, the designer would have researched various design factors.

Explain why the following design factors would be researched when designing bicycles.

(i) Durability **1**

(ii) Ease of maintenance **1**

(iii) Aesthetics **1**

Total marks 9

[Turn over

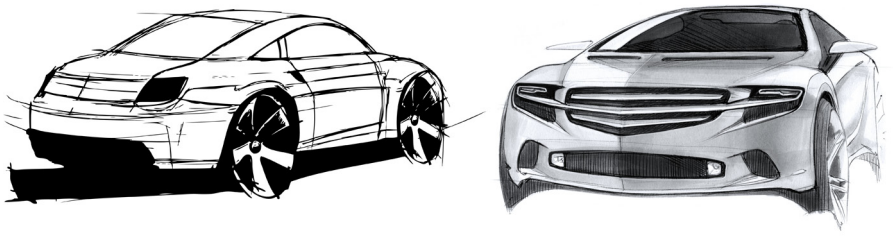
MARKS DO NOT WRITE IN THIS MARGIN

3. The environmental impact of a product can often influence our buying decisions.

Explain ways in which designers could reduce the environmental impact of their products.

(*You may wish to refer to products with which you are familiar.*) **3**

4. Designers use a range of graphic techniques to communicate their designs.



(a) 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) Initial ideas **2**

(ii) Planning for manufacture **2**

[Turn over

4. (continued)

(b) Designers often use models as well as a range of graphic techniques.

State the name of **two** modelling materials and explain why each would be suitable for building models.

(*A different explanation must be given for each material*.) **4**

Total marks 8

MARKS | DO NOT WRITE IN THIS MARGIN

5. A stainless steel colander is shown below.

(a) (i) Give **two** reasons why stainless steel would be suitable for the colander. **2**

_____

_____

_____

_____

(ii) The colander was mass produced.

Describe **two** benefits to the manufacturer of mass production techniques. **2**

_____

_____

_____

_____

[Turn over

5. (continued)

(b) Colanders can also be manufactured from plastic as shown below.

State the name of a suitable process for manufacturing colanders from plastic. **1**

(c) Manufacturers are increasingly using CNC and CADCAM technologies to make their products.

Describe the impact that these technologies have on the manufacturer. **3**

Total marks 8

6. An electric razor is shown below.

The manufacturer wishes to carry out an evaluation of the razor.

(a) Describe a suitable user trial to evaluate the ergonomics of the razor. **2**

(b) State **two** key questions that would be included in a survey to evaluate the aesthetics of the razor. **2**

[Turn over for Question 6 (c) on *Page fourteen*

6. (continued)

(c) There are a wide variety of razors available on the market today.

With such a large selection, designers need to find ways of marketing their product in order to make it stand out from the competition.

Describe **two** marketing techniques that a design team may use to promote their product. **2**

(d) Designers often have to generate new ideas to stay ahead of their competitors.

Describe **one** idea generation technique that they could use. **2**

Total marks 8

[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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Section 2 Question 2—Image of a Team GB bicycle.

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