

FOR OFFICIAL USE



National
Qualifications
2022

Mark

X819/75/01

Design and Manufacture

TUESDAY, 10 MAY
9:00 AM – 10:45 AM



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.

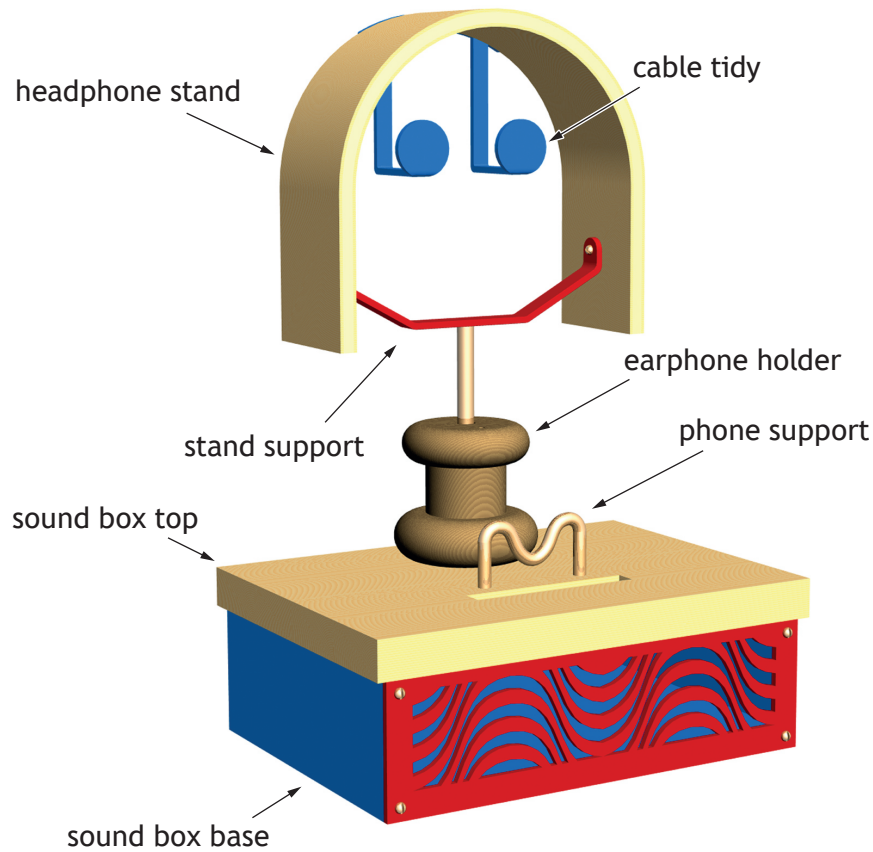


SECTION 1 — 60 marks

Attempt ALL questions

MARKS DO NOT WRITE IN THIS MARGIN

1. A design proposal for a sound box with a phone and accessory holder is shown below.



- (a) The sound box top was made from softwood.

(i) Name a suitable softwood for the sound box top.

1

The sound box base was made from MDF.

(ii) State a benefit of using MDF rather than softwood.

1



[Turn over for next question

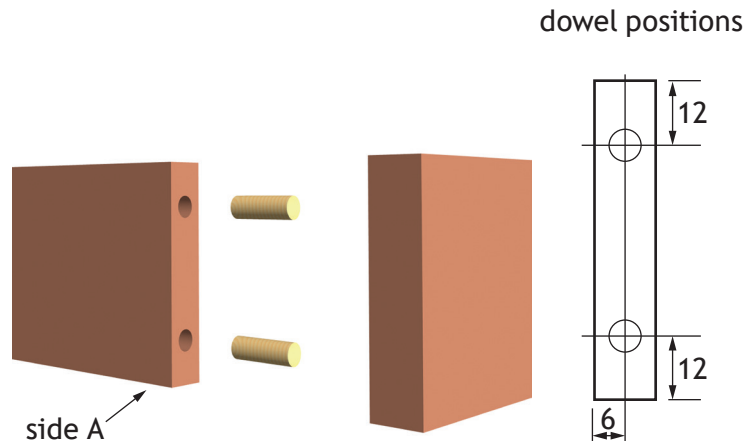
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* X 8 1 9 7 5 0 1 0 3 *

1. (continued)

(b) Dowel joints were used to join the sides of the sound box together.



(i) Describe how to **mark out** the positions of the dowel holes on side A, with reference to workshop tools.

2

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

1. (b) (continued)

The dowel holes in side A were drilled to a depth of 15mm.

(ii) Outline how to ensure the holes were drilled to this depth.

1

(iii) Name an alternative joint that could be used to join the sides of the sound box.

1

(c) Pieces of softwood were joined together to make the sound box top.



(i) Name a suitable adhesive to join the pieces of softwood together.

1

(ii) Outline a suitable method of holding the pieces of softwood together until the adhesive sets.

1

1. (c) (continued)

Varnish was brushed on to the sound box top.

(iii) Describe how to achieve a high quality brushed finish.

2



1. (continued)

(d) The cable tidies were made from acrylic.



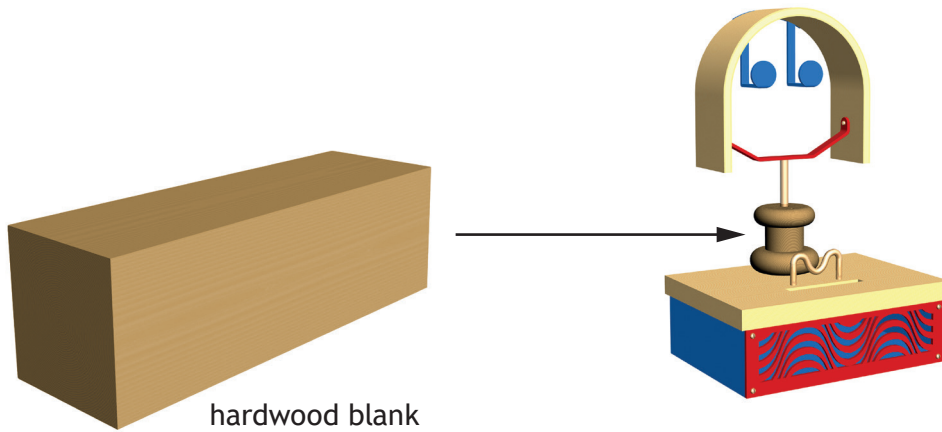
(i) Name an appropriate saw that could be used to cut out the cable tidies. 1

(ii) Describe the stages used to obtain a good finish on the edges of the acrylic after sawing, with reference to workshop tools/equipment. 3

[Turn over

1. (continued)

(e) The earphone holder was turned from a hardwood blank.



(i) Name a suitable hardwood for the earphone holder.

1

(ii) Describe **four** stages in preparing the hardwood blank **before** fitting it on the woodturning lathe, with reference to workshop tools.

4

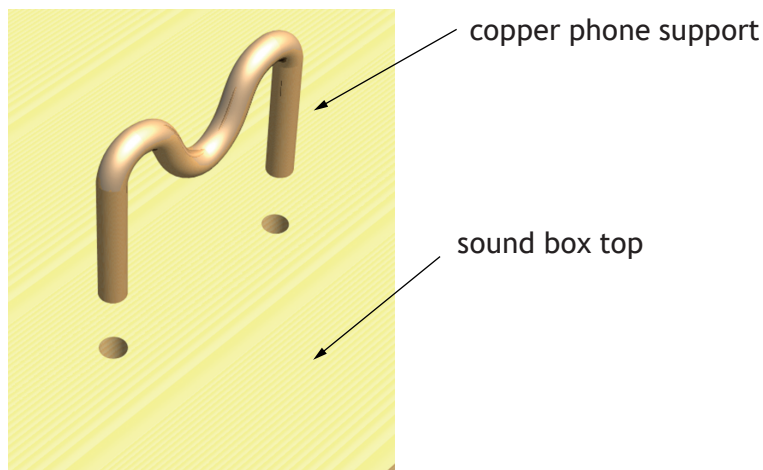
Sketches may be used to illustrate your answer in the box below.

1. (e) (continued)

(iii) Outline **two** ways of ensuring a high quality finish on the earphone holder when using the wood lathe.

2

(f) The phone support was made from copper and joined to the sound box top using epoxy resin.



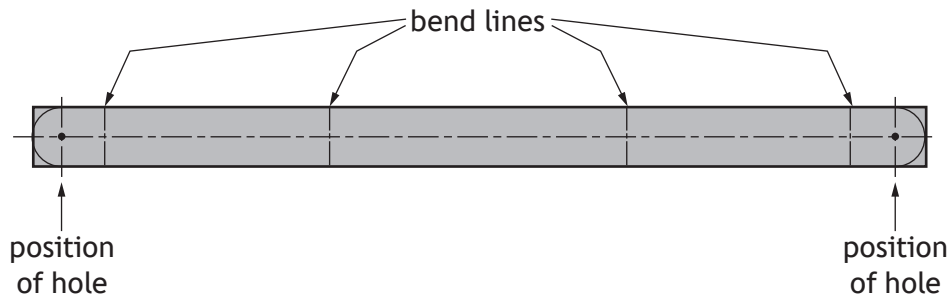
Outline **two** reasons why epoxy resin is a suitable adhesive.

2

[Turn over

1. (continued)

(g) The stand support was made from mild steel and marked out as shown below.



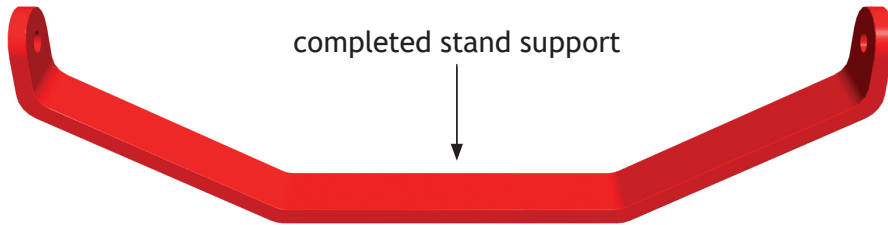
(i) Describe how to measure and mark out the stand support, with reference to workshop tools.

3

Sketches may be used to illustrate your answer in the box below.

1. (g) (continued)

The stand support was bent to shape and finished as shown below.



- (ii) Describe how to form the bends on the stand support, with reference to workshop tools.

2

The mild steel stand support was dip coated in plastic.

- (iii) Explain why the stand support was dip coated.

2



2. A camping tent is shown below.



Designers use research techniques such as user trips and questionnaires to gather information.

(a) Outline **two** pieces of information that could be gathered from a user trip on the camping tent.

2

(b) Describe the key stages of carrying out a questionnaire.

3

3. A designer often uses idea generation techniques.

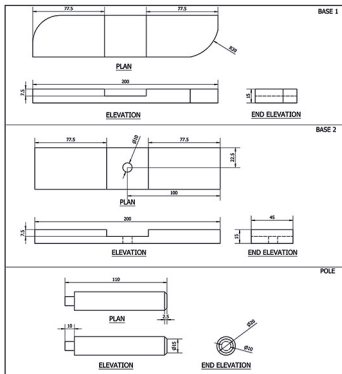
Describe the key stages of an idea generation technique with which you are familiar.

3

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



4. The **two** graphic techniques shown below were used during the design of a headphone stand.



working drawing



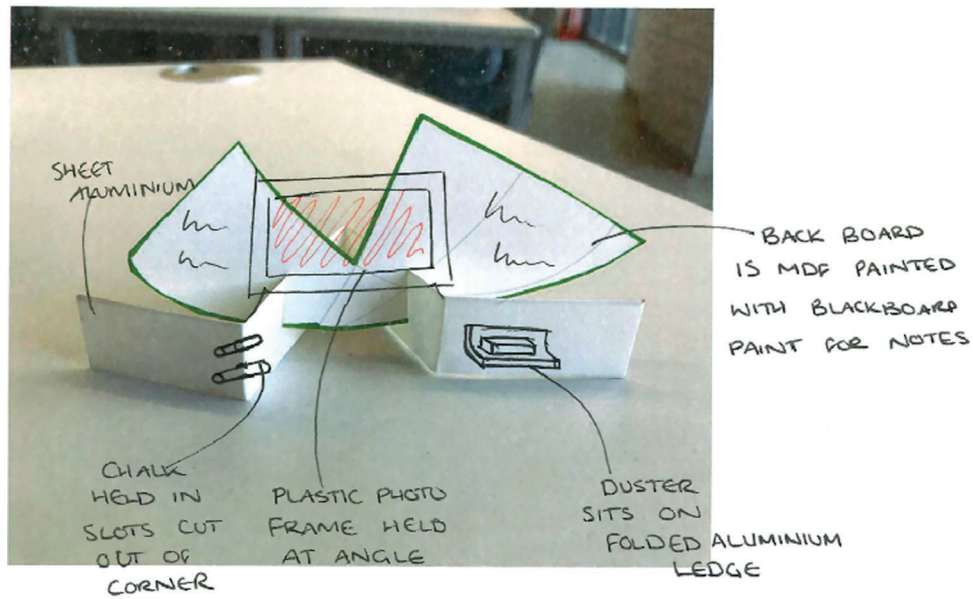
computer-generated graphic

Outline the reasons for using the following graphic techniques in the design process:

(a) working drawing _____ 2

(b) computer-generated graphic _____ 2

5. Designers often use sketch models as shown below.



Describe **two** benefits to designers of using sketch models.

2

[Turn over

6. A sun lounger is shown below.



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

(a) Describe how ergonomics may have influenced the design of the sun lounger.

4

6. (continued)

(b) Describe how function may have influenced the design of the sun lounger.

2

(c) Describe how the life expectancy of the sun lounger could be extended by the designer.

2

[Turn over



7. The design of products may evolve as a result of technology push or market pull.

(a) Describe what is meant by technology push.

1

(b) Describe what is meant by market pull.

1

New products can be difficult to launch in a competitive market.

(c) Outline **two** marketing techniques that could be used to promote new products.

2

8. A child's pedal car is shown below.



Describe the aesthetic aspects of the child's pedal car.

4

[Turn over

SECTION 2 — 20 marks

Attempt ALL questions

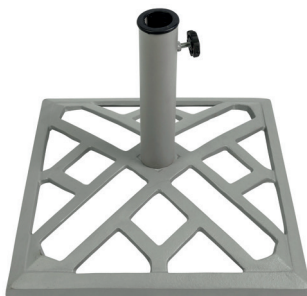
MARKS

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9. The parasol bases shown below have been produced using a range of materials and processes.



parasol base



metal base

Metals

- copper
- cast iron
- aluminium.



plastic base
(filled with water)

Plastics

- acrylic
- polypropylene
- urea formaldehyde.

- (a) Select the most appropriate material for each base from the lists provided and state why they would be suitable.

A different property must be given for each item.

(i) Metal base _____ 1

Suitable because _____ 1

(ii) Plastic base _____ 1

Suitable because _____ 1



* X 8 1 9 7 5 0 1 2 0 *

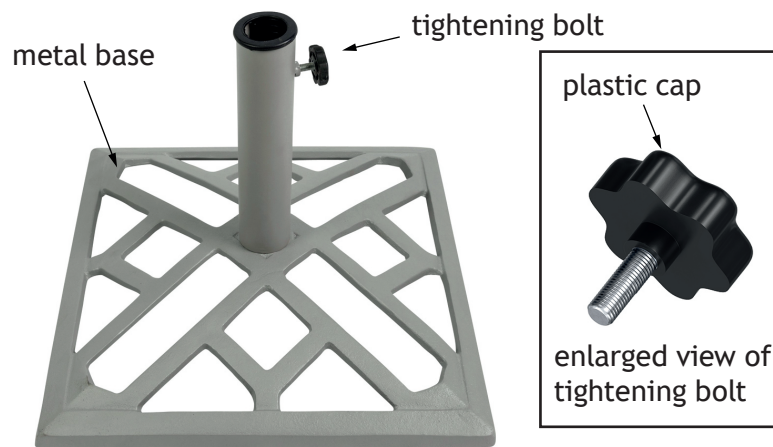
9. (continued)

Rotational moulding was used to manufacture the plastic base.

(b) State **two** identifying features of rotational moulding.

2

(c) The metal base is shown below.



Name a process that could have been used to manufacture each of the following parts:

(i) metal base _____ 1

(ii) plastic cap _____ 1

[Turn over

10. Laser cutters are widely used in the manufacture of products.



(a) Describe the impact that the use of technologies such as laser cutting have had on the manufacture of products.

4

10. (continued)

Changes to society have occurred due to modern manufacturing technologies.

(b) Describe how manufacturing technologies have impacted society.

2

[Turn over



11. Furniture can be manufactured using one-off production methods.



(a) Explain two benefits of one-off production.

2

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ADDITIONAL SPACE FOR ANSWERS



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