

Cambridge International AS & A Level

DESIGN & TECHNOLOGY

9705/12

Paper 1

October/November 2024

3 hours

You must answer on the answer booklet/paper.

You will need: Answer booklet/A4 paper Coloured pencils
A3 drawing paper (2 sheets) Extra sheets of A3 drawing paper if needed
A range of design drawing equipment

INSTRUCTIONS

- Answer **three** questions in total:
 - Section A: answer **one** question on the answer booklet/A4 paper provided.
 - Section B: answer **one** question on the answer booklet/A4 paper provided.
 - Section C: answer **one** question on A3 drawing paper. Use both sides of the paper.
 - You may request additional sheets of A3 drawing paper, but only if you have used up both sides of each of the 2 sheets provided.
 - If you have been given an answer booklet, follow the instructions on the front cover of the answer booklet.
 - Use a black or dark blue pen.
 - Write your name, centre number and candidate number on all the work you hand in.
 - Do **not** use an erasable pen or correction fluid.
 - You may use an HB pencil, or coloured pencils as appropriate, for any diagrams, graphs or rough working.
 - At the end of the examination, fasten all your work together. Do **not** use staples, paper clips or glue.

INFORMATION

- The total mark for this paper is 120.
 - The number of marks for each question or part question is shown in brackets [].
 - All dimensions are in millimetres.

Section A

Answer **one** question from this section on the Answer Booklet/A4 paper provided.

- 1 Fig. 1.1 gives details of a desk tidy which is to be made in a school workshop.

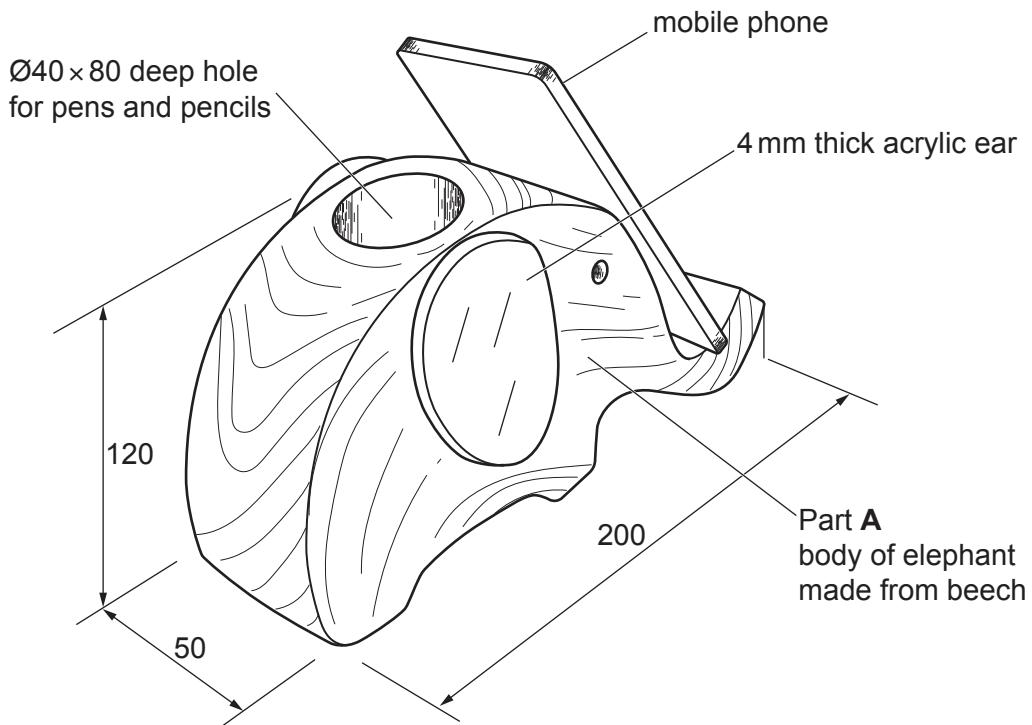


Fig. 1.1

- (a) Explain **one** reason why the Ø40 hole in the body of the elephant is drilled before the body is cut to shape. [2]

- (b) Use notes and sketches to describe:

(i) how to mark out and drill the Ø40 hole in Part A [6]

(ii) how to mark out and cut Part A to shape. [6]

You must give details about the tools, equipment and processes involved and the safety precautions that have to be undertaken at each stage.

- (c) Use notes and sketches to show how to make two identical acrylic ears and join them to the body of the elephant. [6]

You must give details about the tools, equipment and processes involved and the safety precautions that have to be undertaken at each stage.

- 2 Fig. 2.1 gives details of a Styrofoam model of a hairdryer which is to be made in a school workshop.

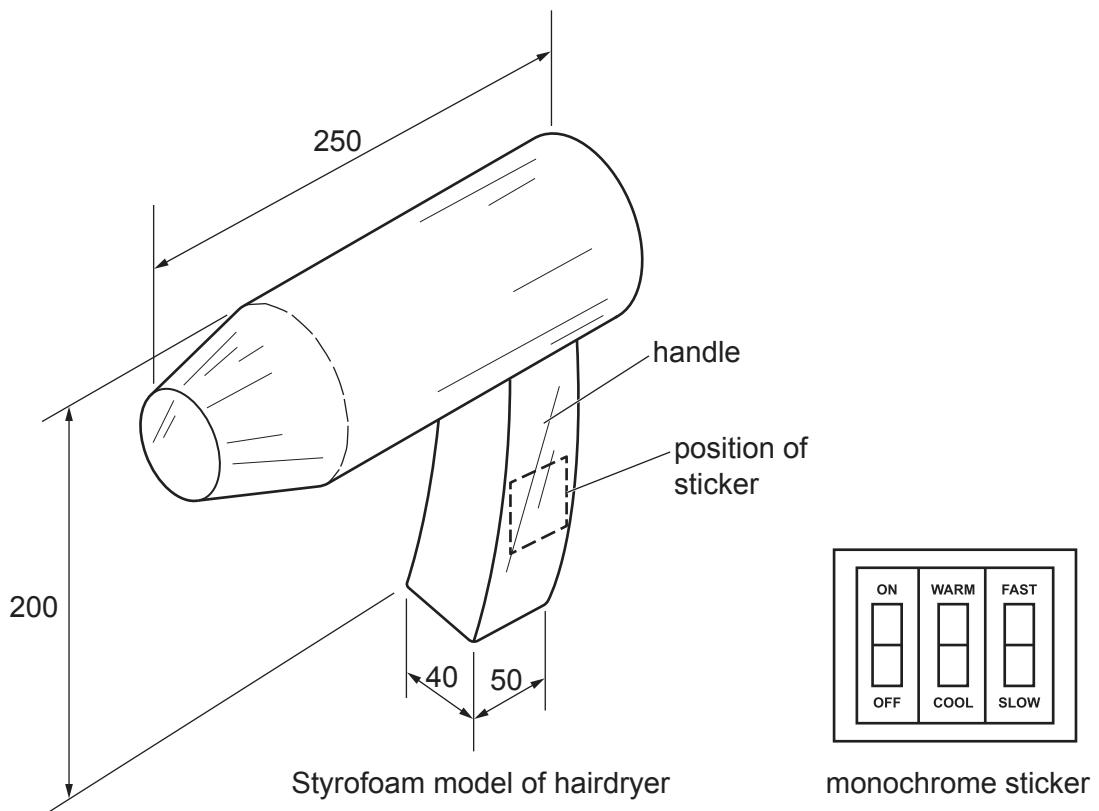


Fig. 2.1

- (a) Give **two** reasons why Styrofoam is a suitable material for the model of the hairdryer. [2]

- (b) Use notes and sketches to describe:

- (i) how to make the handle from a sheet of 20 mm thick Styrofoam [6]

- (ii) how to smooth the Styrofoam model and apply a paint finish. [6]

You must give details about the tools, equipment and processes involved and the safety precautions that have to be undertaken at each stage.

- (c) Use notes and sketches to describe how to make and apply the monochrome sticker to the model of the hairdryer. [6]

You must give details about the tools, equipment and processes involved and the safety precautions that have to be undertaken at each stage.

- 3 Fig. 3.1 gives details of a toolmaker's clamp which is to be made in a school workshop.

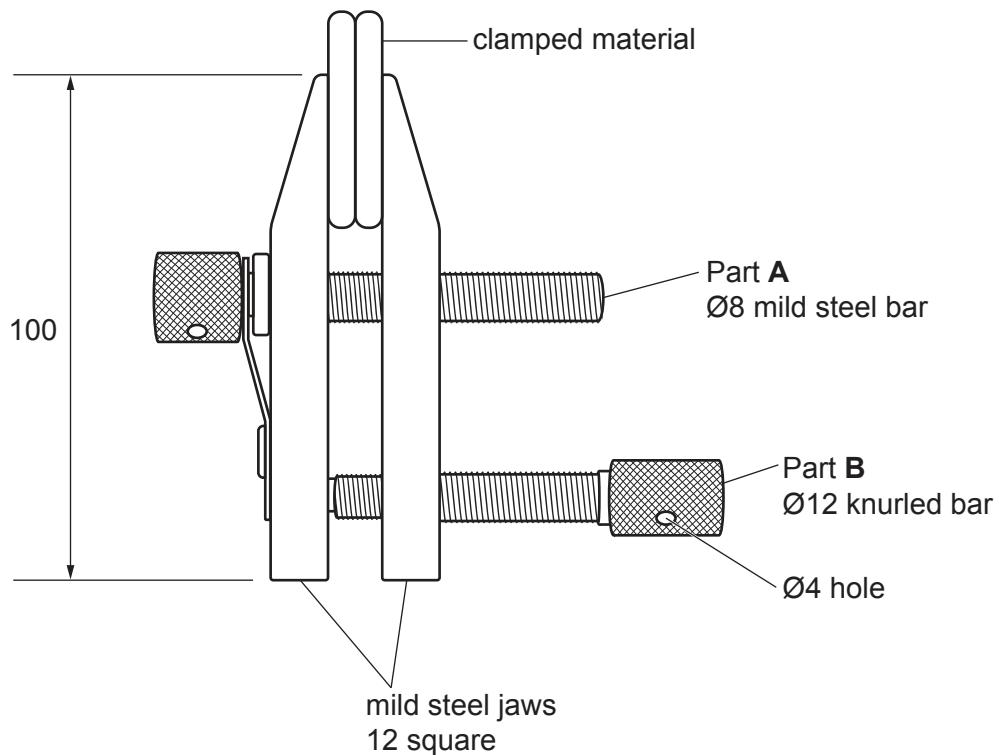


Fig. 3.1

- (a) Explain **one** reason why Part **B** is knurled. [2]
- (b) Use notes and sketches to describe how to cut the M8 external thread on Part **A**. [6]
- You must give details about the tools, equipment and processes involved and the safety precautions that have to be undertaken at each stage.
- (c) Use notes and sketches to show the difference between clearance, blind and internally threaded holes. [6]
- (d) Use sketches and notes to describe:
- (i) motion conversion in the toolmaker's clamp [3]
 - (ii) how the Ø4 hole could be used to increase leverage. [3]

Section B

Answer **one** question from this section on the Answer Booklet/A4 paper provided.

- 4 Fig. 4.1 shows an incomplete design for an outdoor game.

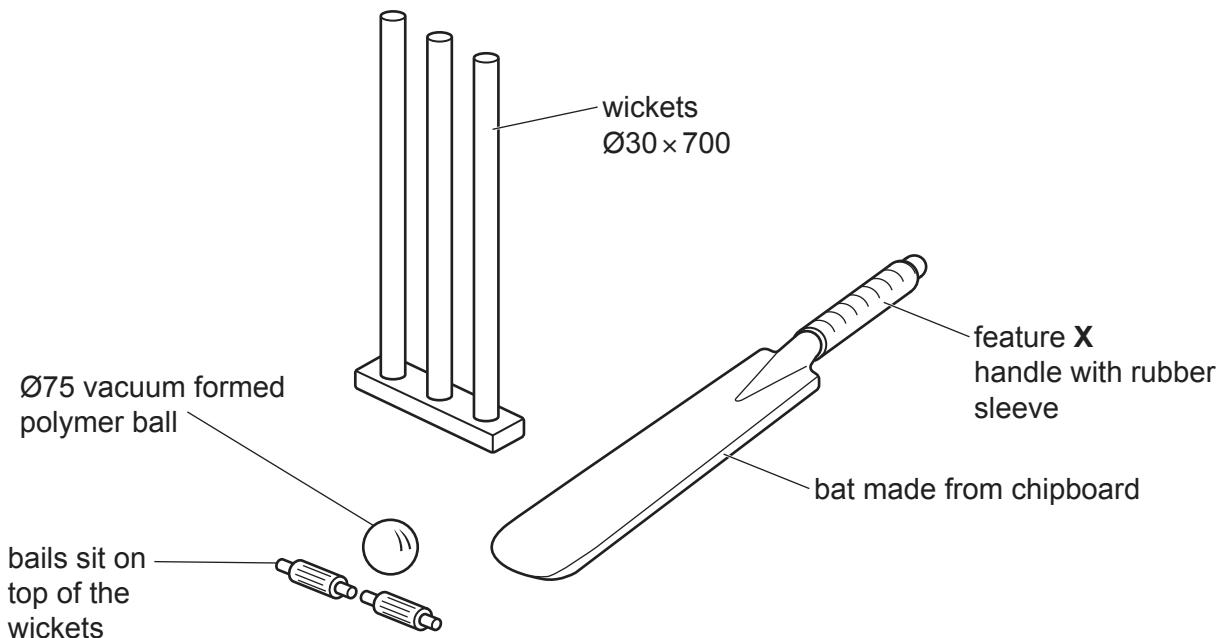


Fig. 4.1

- (a) Explain the function of the design feature shown at X. [2]
- (b) Identify and describe **two** problems that make the outdoor game unsuitable for use. [4]
- (c) Use notes and sketches to explain how the outdoor game would need to be changed to overcome the **two** problems you have identified in part (b). [6]
- (d) Discuss why manufacturers of products work to a detailed specification. Your answer should:
- analyse the given situation and identify **three** relevant issues raised by the question [3]
 - explain why you consider these issues to be relevant [3]
 - contain specific examples/evidence to support your conclusions. [2]

- 5 Fig. 5.1 shows a development (net) of an incomplete design for a box of tissues and a protective cover. The protective cover fits over the assembled box.

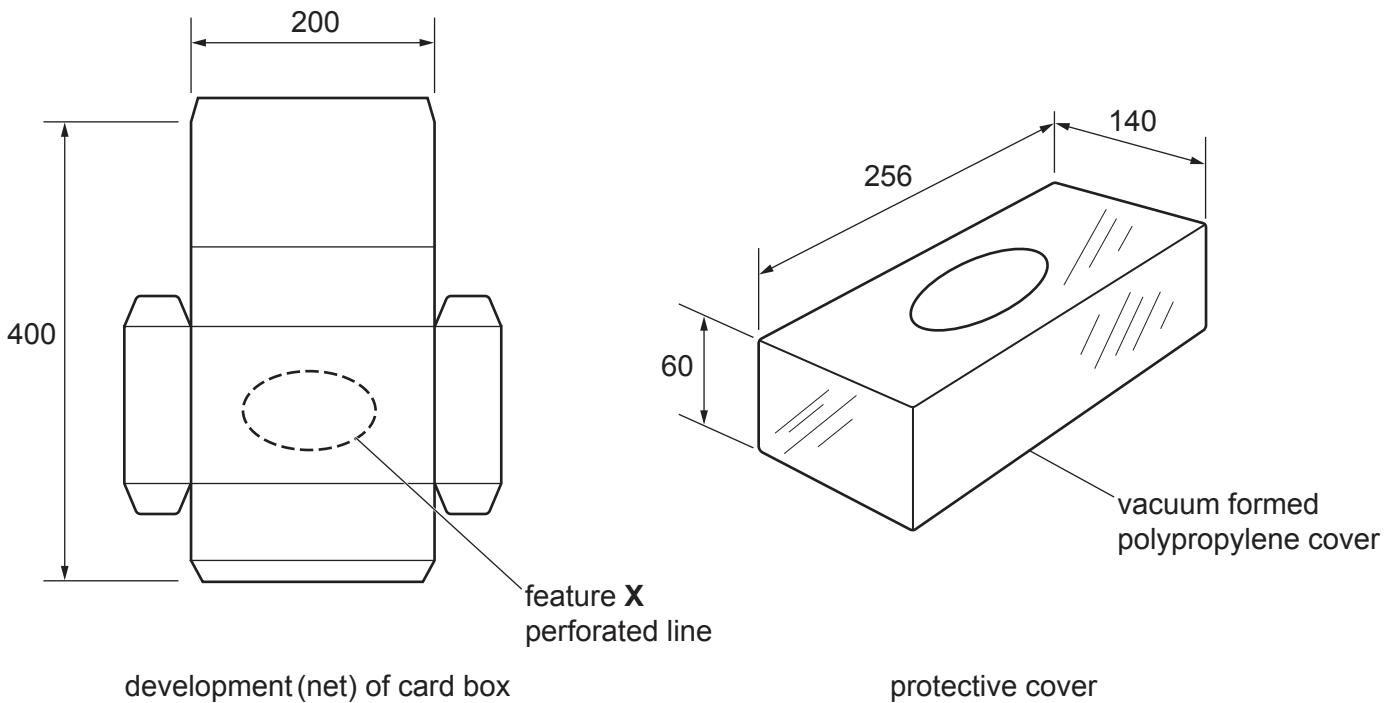


Fig. 5.1

- (a) Explain the function of the design feature shown at **X**. [2]
- (b) Identify and describe **two** problems that make the box of tissues or protective cover unsuitable for use. [4]
- (c) Use notes and sketches to explain how the box of tissues or protective cover would need to be changed to overcome the **two** problems you have identified in part (b). [6]
- (d) Discuss why designers of packaging model their ideas before selecting one to fully develop. Your answer should:
- analyse the given situation and identify **three** relevant issues raised by the question [3]
 - explain why you consider these issues to be relevant [3]
 - contain specific examples/evidence to support your conclusions. [2]

- 6 Fig. 6.1 shows an incomplete design for a bench mounted bandsaw.

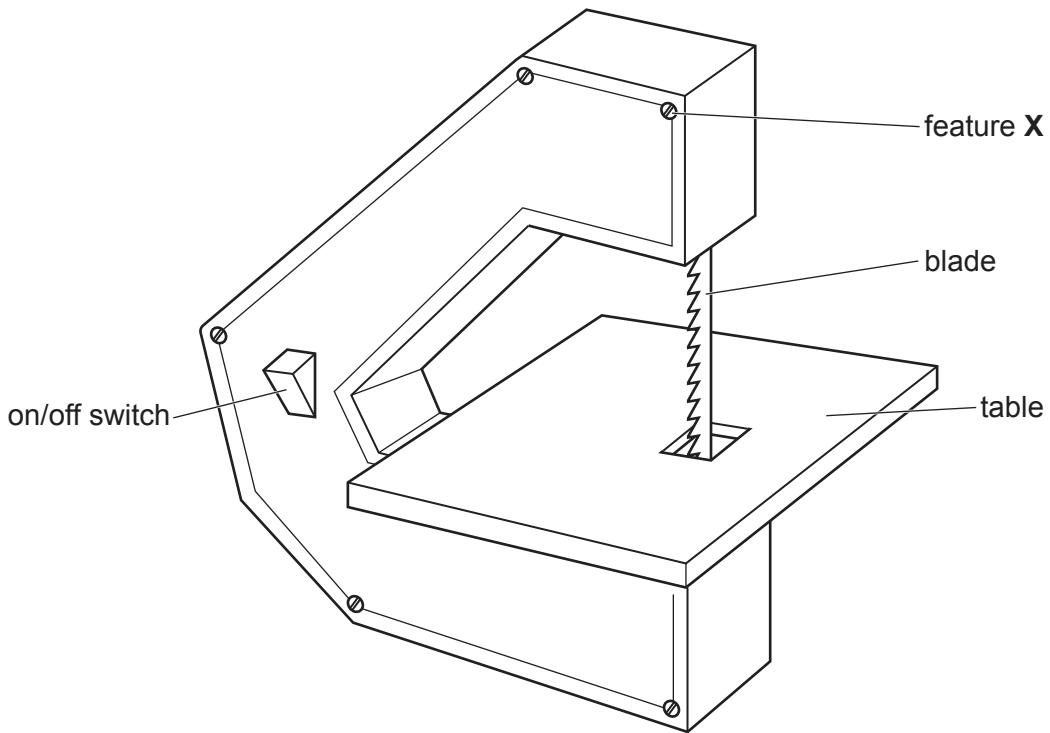


Fig. 6.1

- (a) Explain the function of the design feature shown at X. [2]
- (b) Identify and describe **two** problems with the bench mounted bandsaw. [4]
- (c) Use notes and sketches to explain how the bench mounted bandsaw would need to be changed to overcome the **two** problems you have identified in part (b). [6]
- (d) Discuss why manufacturers of electrical appliances provide safety information and operating instructions. Your answer should:
- (i) analyse the given situation and identify **three** relevant issues raised by the question [3]
 - (ii) explain why you consider these issues to be relevant [3]
 - (iii) contain specific examples/evidence to support your conclusions. [2]

Section C

Answer **one** question from this section on the plain A3 paper provided.

You are provided with two sheets of plain A3 paper. You should use **both** sides of the paper. **Each** of the four parts **(a) – (d)** of the question you choose to answer should take up one side of paper.

When you are asked to **develop** a design you must show, using notes and sketches, the development and evaluation of a **range** of ideas into a single design solution. The design proposal should be annotated to give details about materials, joining methods and important sizes.

- 7 Fig. 7.1 shows details of the design requirements for a display unit that is to be used in a sportswear shop to sell items of clothing that are on special offer.

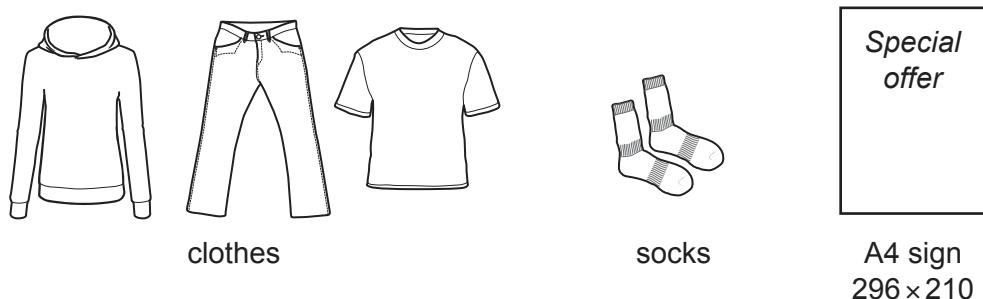


Fig. 7.1

- (a) Use notes and sketches to **develop** a design for a display unit for the clothes shown in Fig. 7.1. The display unit must be able to rotate so that customers can view the different types of clothing. [20]
- (b) Use notes and sketches to **develop** a design for a rack for socks that fits on the display unit designed in **part (a)**. [20]
- (c) Use notes and sketches to **develop** a design for a sign holder that fastens to the rack designed in **part (b)** and holds the A4 sign. It must be possible to easily change the A4 sign to show the latest items of clothing that are on special offer. [20]
- (d) Produce a pictorial (3D) rendered drawing of the complete display unit which shows all of the features that you have designed in **parts (a) – (c)**. [20]

- 8 Fig. 8.1 shows details of the design requirements for a collection box for a charity for the homeless called 'Haven'.

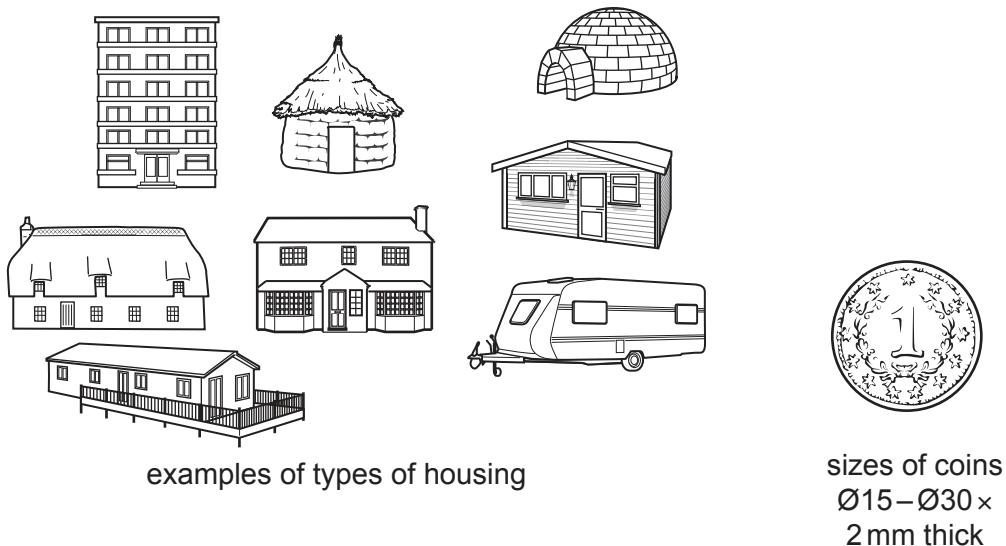


Fig. 8.1

- (a) Use notes and sketches to **develop** a design for a one-piece card development (net) collection box that represents the work of the charity and is in the style of a type of housing. The development (net) must include a means of depositing and removing coins. [20]
- (b) Use notes and sketches to **develop** a design for graphics for the collection box designed in part (a). The graphics must be based upon the name 'Haven' and represent the work of the charity. [20]
- (c) Use notes and sketches to **develop** a design for a low-cost promotional item to be given to people who donate to the charity. The promotional item must be easily mass produced. [20]
- (d) Produce a pictorial (3D) rendered drawing which shows all of the features that you have designed in parts (a) – (c). [20]

- 9 Fig. 9.1 shows an incomplete design for a game.

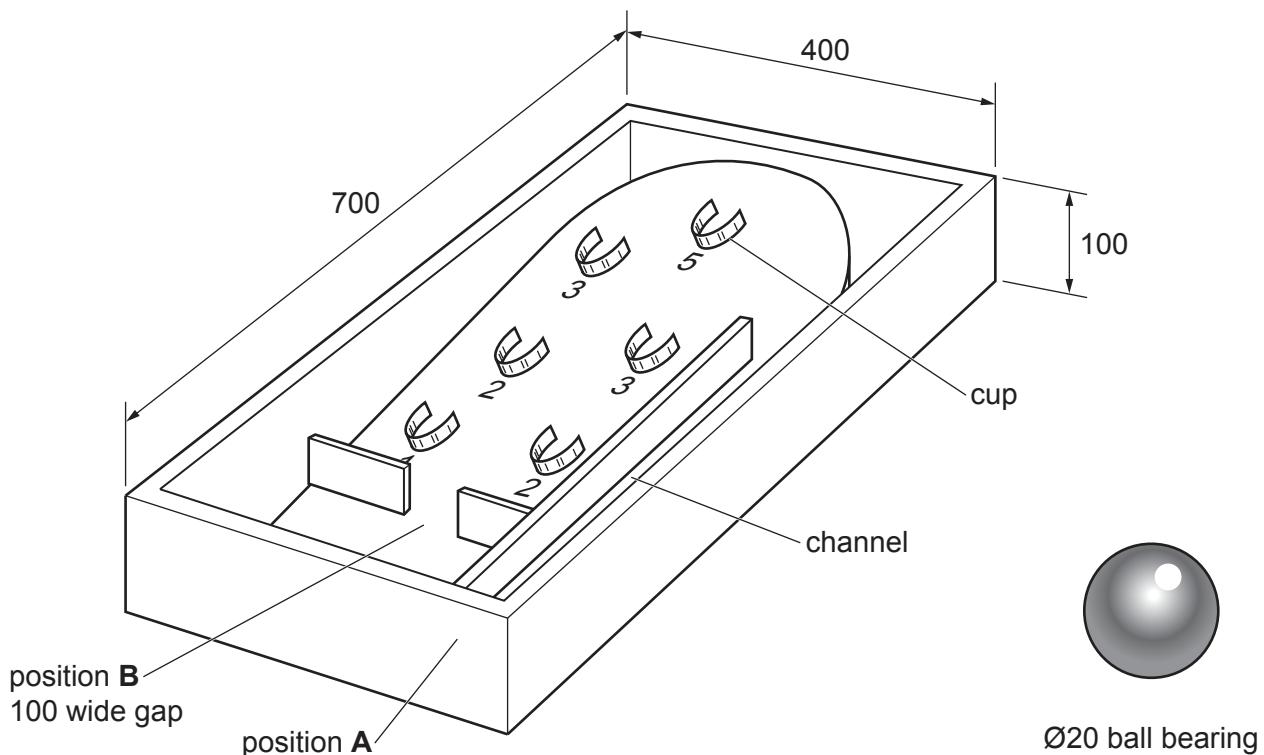


Fig. 9.1

- (a) Use notes and sketches to **develop** a design for a mechanical device that will propel the Ø20 ball bearing forward along the channel. The device must fit in position **A** on the game. [20]
- (b) Use notes and sketches to **develop** a design for a device that will allow the player to prevent the Ø20 ball bearing going through the 100 mm wide gap and then propel it towards the cups. The device must fit in position **B** on the game. [20]
- (c) Use notes and sketches to **develop** a design for a device that will give a visual **or** audible warning when the Ø20 ball bearing comes to rest in one of the cups. [20]
- (d) Produce a pictorial (3D) rendered drawing of the complete game which shows all of the features that you have designed in **parts (a) – (c)**. [20]

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced online in the Cambridge Assessment International Education Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at www.cambridgeinternational.org after the live examination series.

Cambridge Assessment International Education is part of Cambridge Assessment. Cambridge Assessment is the brand name of the University of Cambridge Local Examinations Syndicate (UCLES), which is a department of the University of Cambridge.