

# Cambridge International AS & A Level

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DESIGN & TECHNOLOGY

9705/13

Paper 1

October/November 2020

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

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## 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.

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This document has **12** pages. Blank pages are indicated.

## Section A

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

- 1 Fig. 1.1 shows details of the development (net) of an A4 photo frame. The photo frame is to be made in a school workshop.

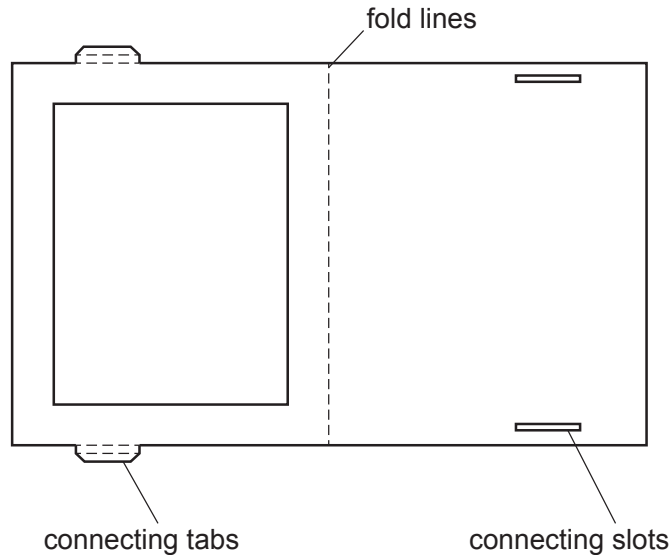


Fig. 1.1

- (a) State **two** materials that would be suitable to make the photo frame. [2]
- (b) (i) Use notes and sketches to describe how a single photo frame would be marked out, cut out and assembled. [6]
- (ii) Use notes and sketches to describe modifications that would enable the photo frame to stand up. The modified photo frame must fold flat for ease of transportation. [6]
- (iii) Use notes and sketches to show how jigs and templates might be used to enable the accurate making of multiple products, such as the photo frame. [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 dust pan that is commonly used to collect dirt that has been swept up.

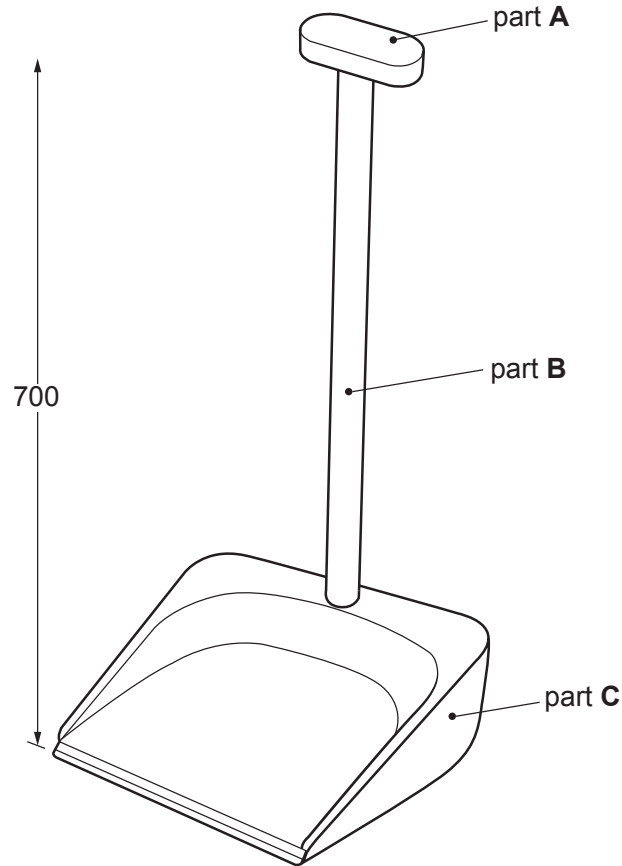


Fig. 2.1

- (a) State **two** materials that would be suitable to make Part B. [2]
- (b) Use notes and sketches to describe:
- (i) how Part A could be made and attached to Part B [6]
- (ii) how Part A could be modified to improve its ergonomic qualities. [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) Explain why products such as Part C are made using injection moulding. [6]

- 3 Fig. 3.1 shows a bicycle stand that is to be made in a school workshop. The bicycle stand will be used outdoors.

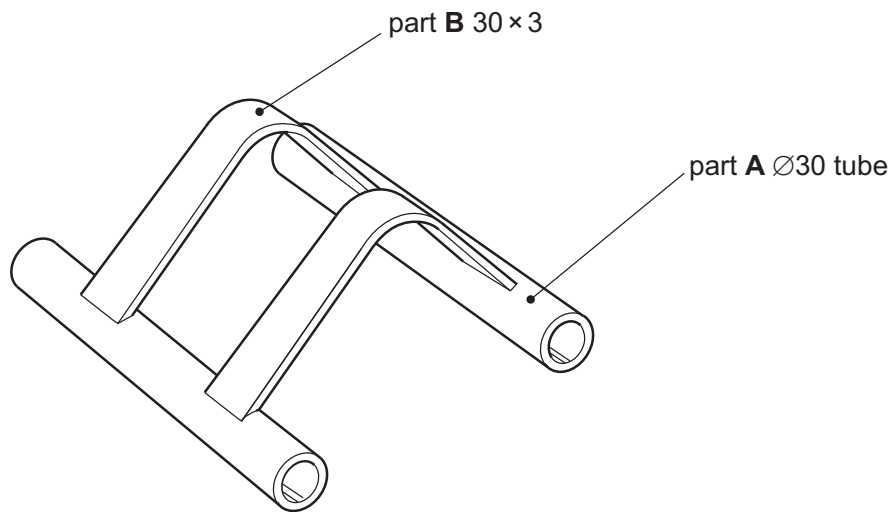


Fig. 3.1

- (a) State **one** material that could be used to make the stand. Give a reason for your choice. [2]
- (b) Use notes and sketches to describe:
- (i) how Part **B** could be formed [6]
  - (ii) how Part **B** could be joined to Part **A** [6]
  - (iii) how two or more bicycle stands could be connected together to become a modular product to hold more bicycles. [6]

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

## Section B

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

- 4 Fig. 4.1 shows a wall mounted letterbox that is fitted to the outside of a house. It is manufactured from recycled aluminium.

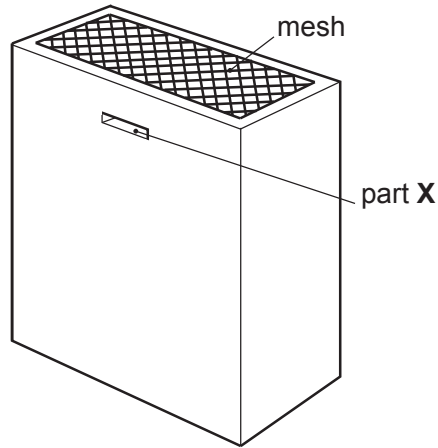


Fig. 4.1

- (a) Explain the function of Part X. [2]
- (b) Identify and describe **two** problems with the design of the letterbox. [4]
- (c) Using notes and sketches, explain how the design would need to be changed to overcome the **two** problems you have identified in **part (b)**. [6]
- (d) Discuss why recycled aluminium is a suitable material from which to manufacture products such as the letterbox.

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]

- 5 Fig. 5.1 gives details of a self-assembly cardboard box that is given to children for colouring and assembling, whilst their parents are looking at new houses.

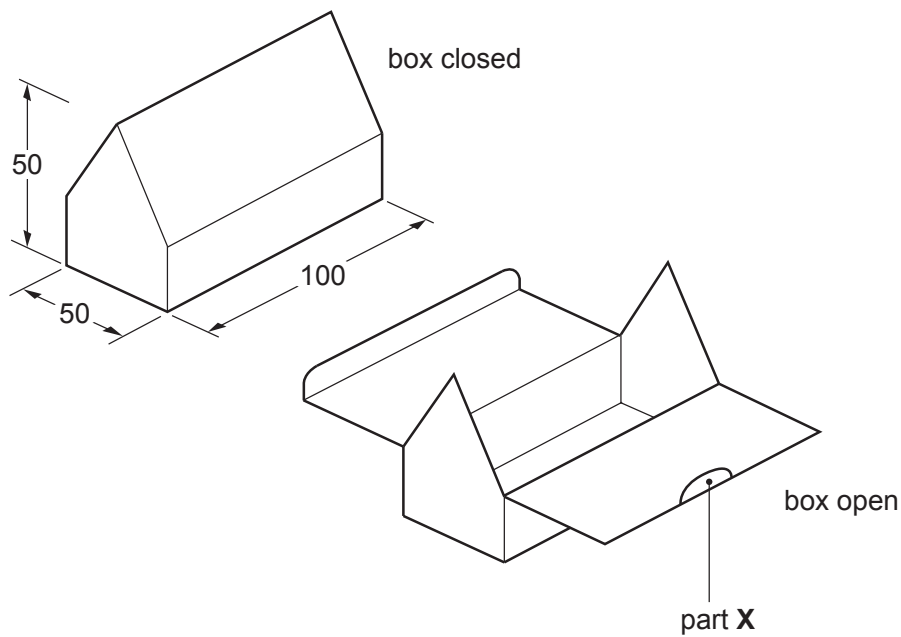


Fig. 5.1

- (a) Explain the function of Part X. [2]
- (b) Identify and describe **two** problems with the design of the self-assembly cardboard box. [4]
- (c) Using notes and sketches, explain how the design would need to be changed to overcome the **two** problems you have identified in **part (b)**. [6]
- (d) Discuss the benefits of cardboard products being manufactured two-dimensionally and then assembled at the point of use.

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]

6 Fig. 6.1 shows a vacuum forming machine that can be found in a school workshop.

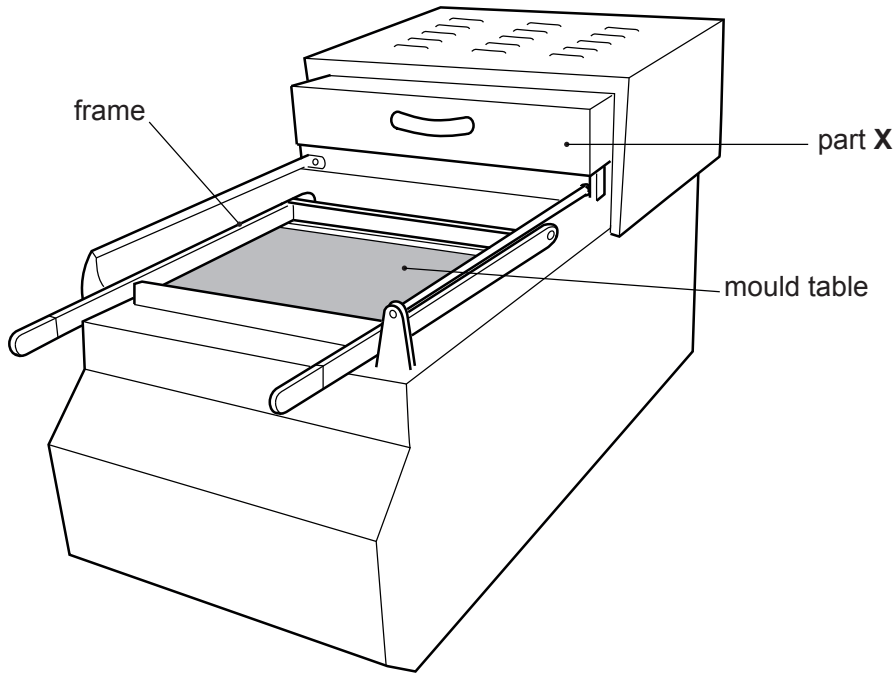


Fig. 6.1

- (a) Explain the function of Part X. [2]
- (b) Identify and describe **two** problems with the design of this vacuum forming machine that make it difficult to use. [4]
- (c) Using notes and sketches, explain how the design would need to be changed to overcome the **two** problems you have identified in **part (b)**. [6]
- (d) Discuss the properties of materials such as aluminium and MDF that allow them to be used as moulds when vacuum forming.

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 solution. The design proposal should be annotated to give details about materials, joining methods and important sizes.

7 Fig. 7.1 shows an incomplete idea for a see-saw.

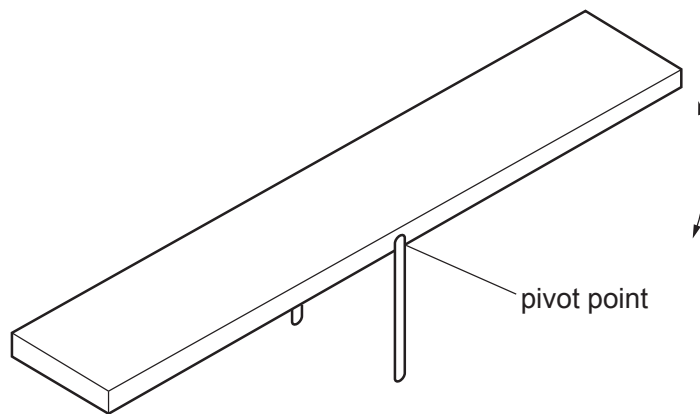
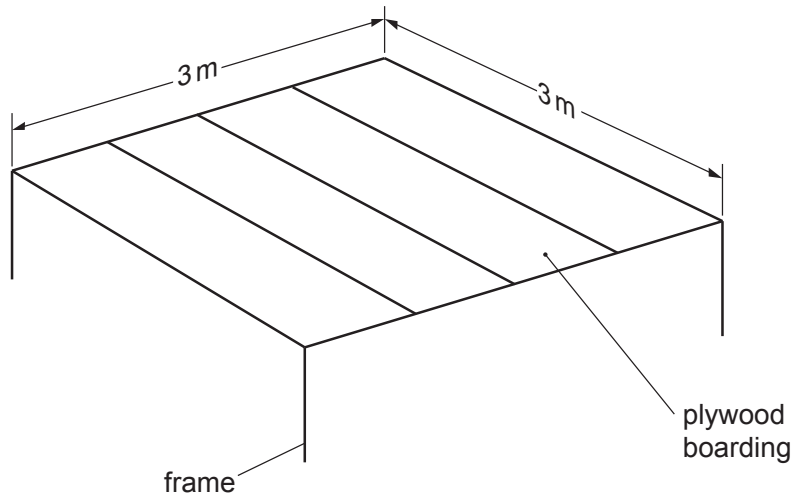


Fig. 7.1

- (a) Using notes and sketches, **develop** a design for a seat to be fitted at each end of the see-saw. The design must be for one person and include a back rest. [20]
- (b) Using notes and sketches, **develop** a design for a base that provides stability and allows the see-saw to pivot. [20]
- (c) Using notes and sketches, **develop** a design for a handle which makes the see-saw safer for children to use. [20]
- (d) Produce a pictorial (3D) rendered drawing of the complete see-saw which shows all of the features that you have designed in **parts (a)–(c)**. [20]



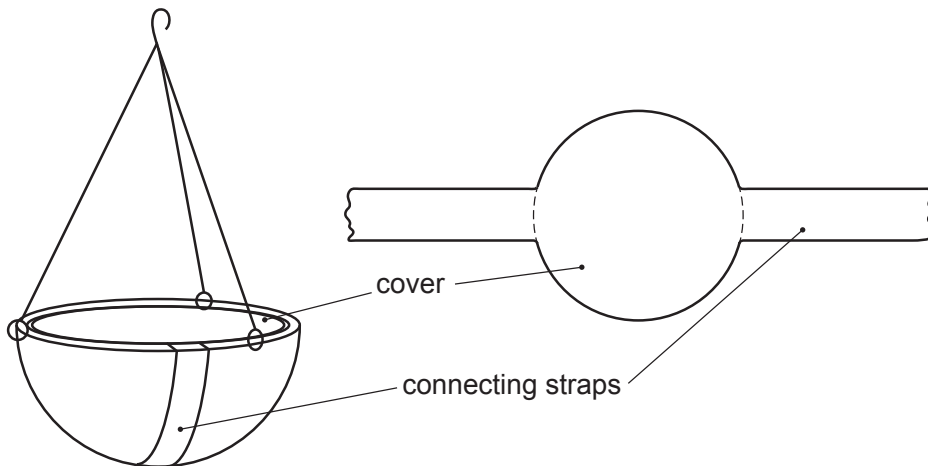
- 8 Fig. 8.1 shows an incomplete idea for a raised portable stage that is used for outdoor events.



**Fig. 8.1**

- (a) Using notes and sketches, **develop** a design for a frame to support the plywood boarding. The design must include a method of taking the frame apart easily for storage and transportation. [20]
- (b) Using notes and sketches, **develop** a design for safety rails. The design must protect the users from falling off the sides and back of the stage. [20]
- (c) Using notes and sketches, **develop** a design for a canopy to protect the users from the weather. It must be possible to adjust and fix the canopy at different angles. [20]
- (d) Produce a pictorial (3D) rendered drawing of the complete stage which shows all of the features that you have designed in **parts (a)–(c)**. [20]

- 9 Fig. 9.1 shows an incomplete idea for a cardboard cover that wraps around a hanging flower basket to protect and market the product.



**Fig. 9.1**

- (a) Using notes and sketches, **develop** a design that allows the connecting straps to join underneath the hanging flower basket to ensure that the cover stays in place. The straps should connect without the use of any additional fixative. [20]
- (b) Using notes and sketches, **develop** a design for the lettering and imagery for the cover. The name of the hanging flower basket is 'Summer Bloom' and the lettering should be in a style that reflects the product. [20]
- (c) Using notes and sketches, **develop** a design for a flower care label that can be attached to the connecting straps. Your design should include details of watering and the temperature required to grow healthy flowers. This information should be shown using symbols not words. [20]
- (d) Produce a pictorial (3D) rendered drawing of the complete wrap around the hanging basket which shows all of the features that you have designed in **parts (a)–(c)**. [20]



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