



# Cambridge International AS & A Level

DESIGN & TECHNOLOGY

9705/12

Paper 1

May/June 2022

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.

This document has **12** pages. Any blank pages are indicated.

## Section A

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

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

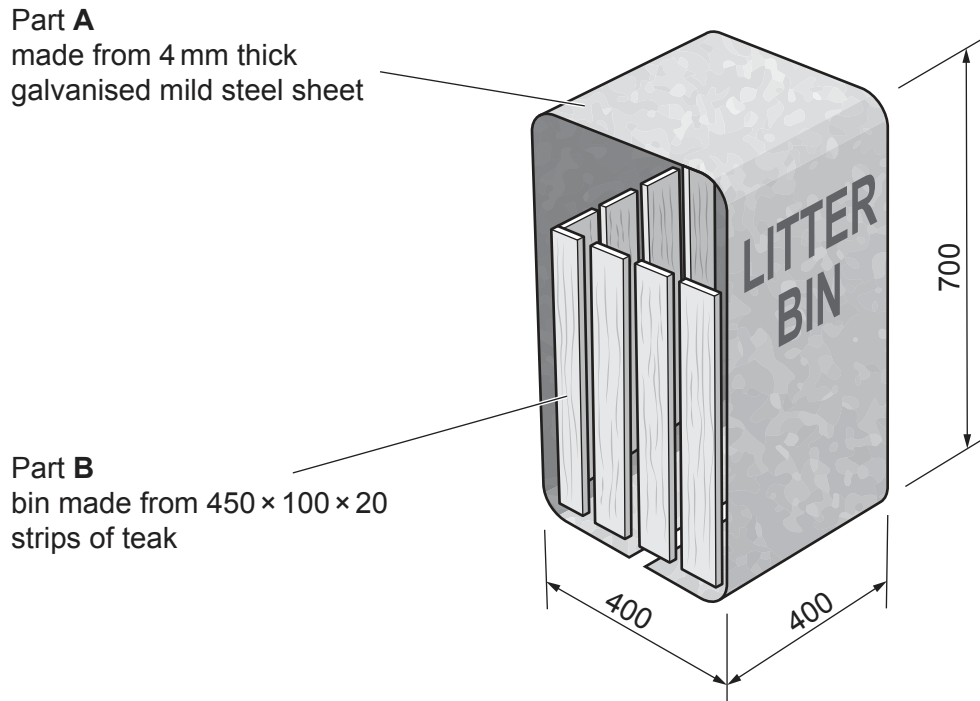


Fig. 1.1

- (a) Give **two** reasons why galvanised mild steel sheet is a suitable material for Part A. [2]
- (b) Use notes and sketches to describe:
- (i) how Part A could be cut and folded into shape [6]
- (ii) a method of accurately applying the words LITTER BIN to Part A [6]
- (iii) how Part B could be made. [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 design for a coffee cup carrier which is to be made in a school workshop.

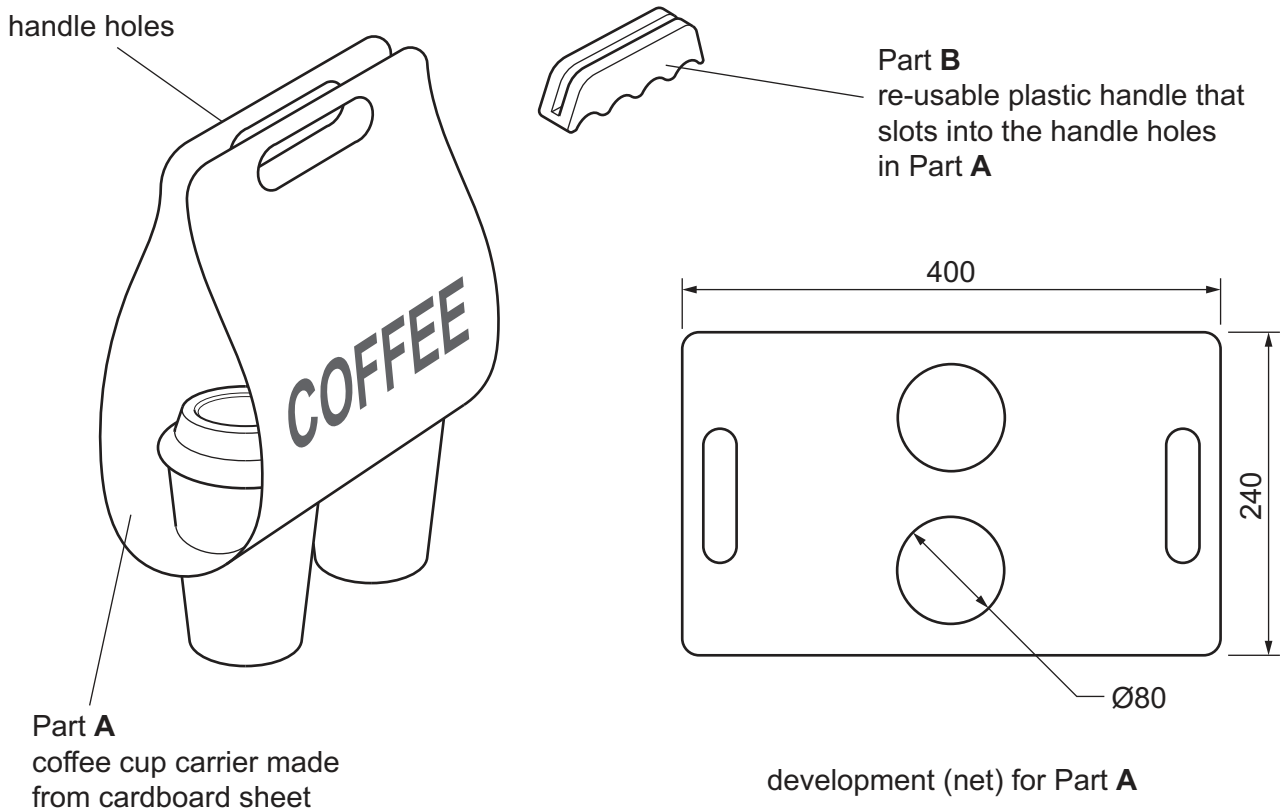
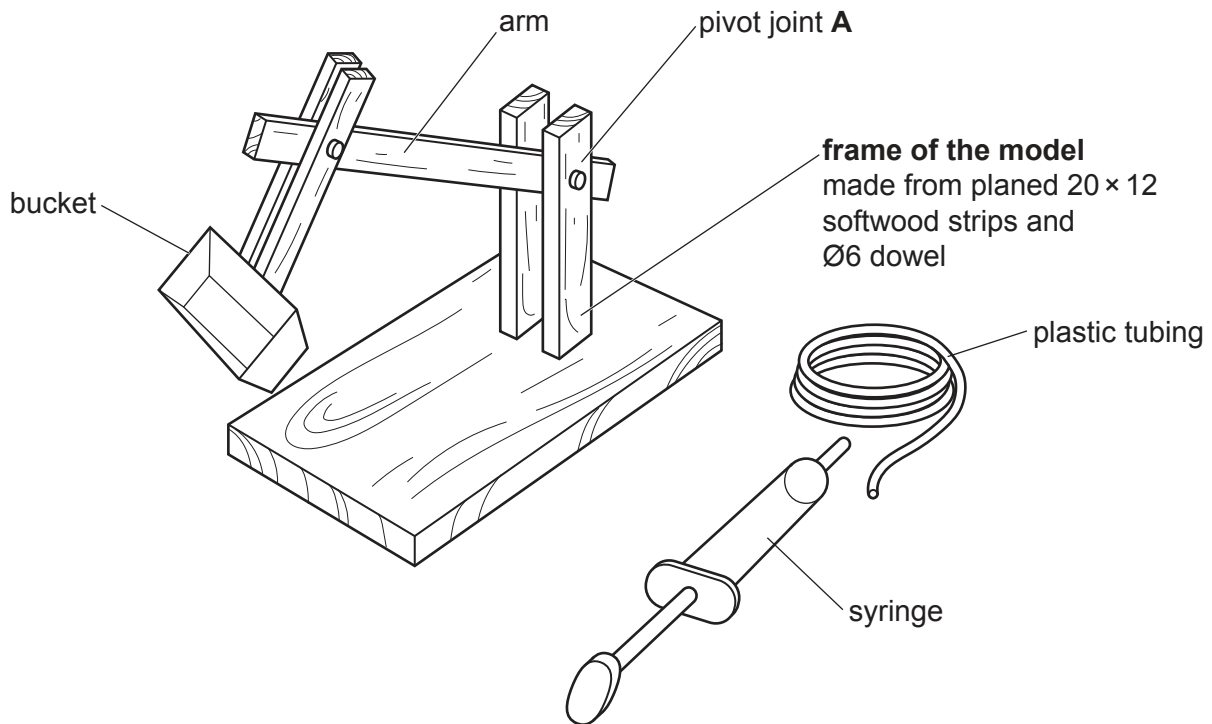


Fig. 2.1

- (a) Give **two** reasons why cardboard is a suitable material for Part A. [2]
- (b) Use notes and sketches to describe:
- (i) a method of adding the word COFFEE to Part A [6]
- (ii) how the development (net) for Part A could be marked out and cut 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 describe a method of making a batch of 500 of Part B. [6]

- 3 Fig. 3.1 gives details of the parts of a model of an earth digger arm which is to be made in a school workshop.



**Fig. 3.1**

- (a) Give **two** reasons why fluids are used in hydraulic systems. [2]
- (b) Use notes and sketches to describe how to:
- (i) prepare planed softwood strips from a rough sawn plank [6]
  - (ii) accurately construct pivot joint **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 sketches and notes to show how the earth digger arm could be made to move up and down using syringes and plastic tubing. [6]

## Section B

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

- 4 Fig. 4.1 gives details of an incomplete outdoor bench. The frame of the bench is made from concrete and the seats from cotton.

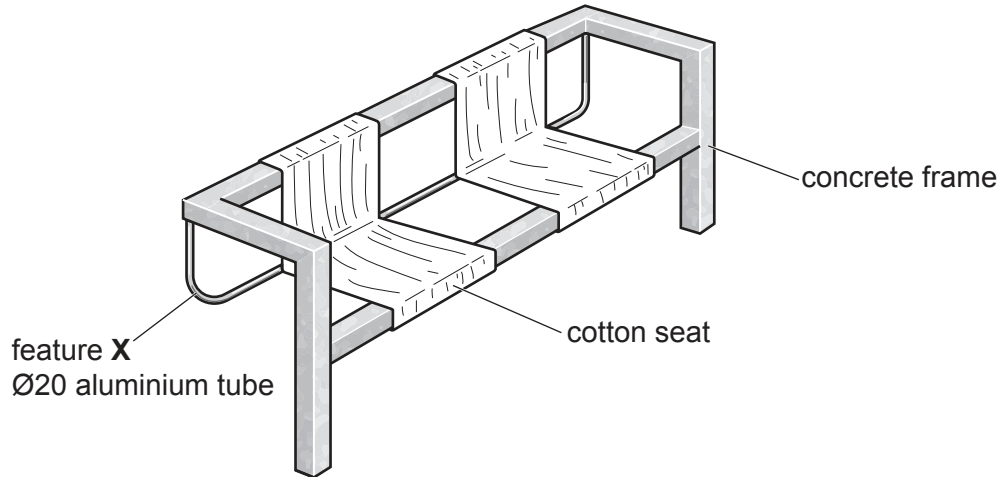
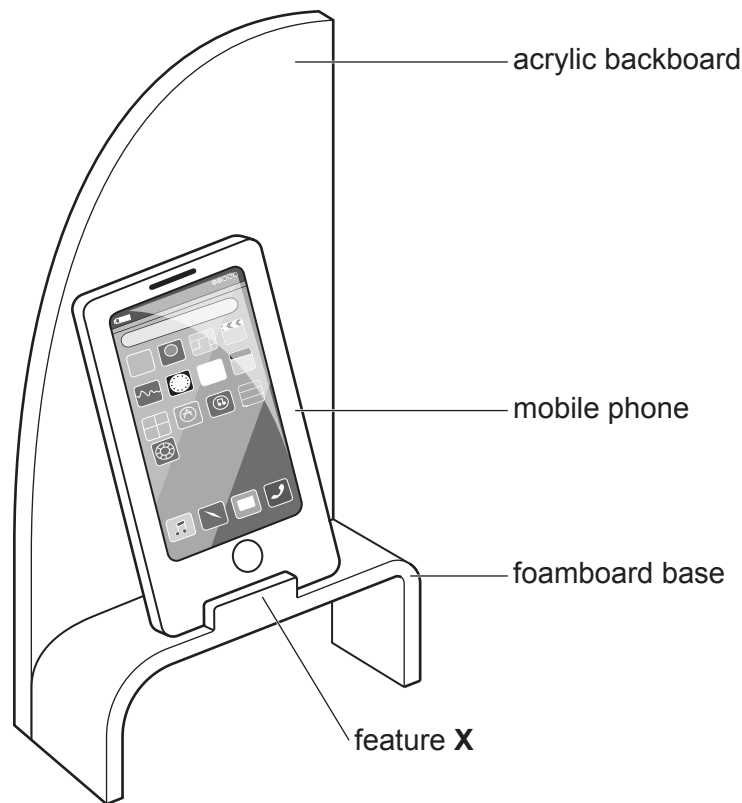


Fig. 4.1

- (a) Explain the function of the design feature shown at **X**. [2]
- (b) Identify and describe **two** problems with the design of the outdoor bench. [4]
- (c) Use notes and sketches to explain how the outdoor bench would need to be changed to overcome the **two** problems you have identified in **part (b)**. [6]
- (d) Discuss why designers of products, such as the outdoor bench, consider the effects of different surface finishes on visual and tactile senses. 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]

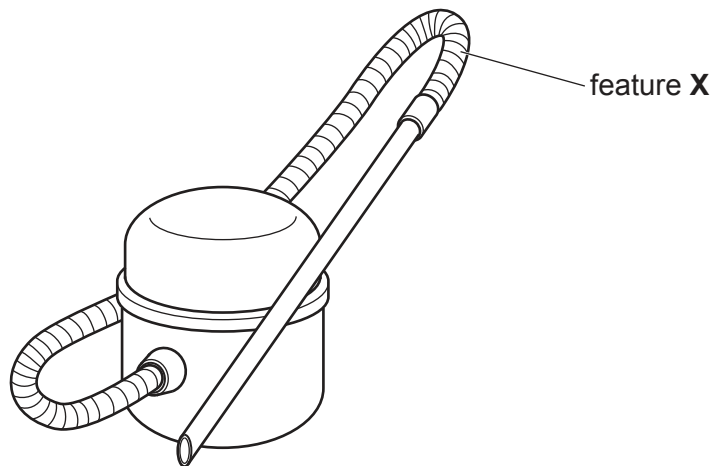
5 Fig. 5.1 gives details of a point of sale (POS) display for a new mobile phone called the 'Radius'.



**Fig. 5.1**

- (a) Explain the function of the design feature shown at **X**. [2]
- (b) Identify and describe **two** problems with the design of the point of sale (POS) display. [4]
- (c) Use notes and sketches to explain how the point of sale (POS) display would need to be changed to overcome the **two** problems you have identified in **part (b)**. [6]
- (d) Discuss why designers and manufacturers of products, such as the point of sale (POS) display for a mobile phone, work to a detailed specification of requirements. 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 gives details of an incomplete electric vacuum cleaner.



**Fig. 6.1**

- (a) Explain the function of the design feature shown at **X**. [2]
- (b) Identify and describe **two** problems with the design of the electric vacuum cleaner. [4]
- (c) Use notes and sketches to explain how the electric vacuum cleaner would need to be changed to overcome the **two** problems you have identified in **part (b)**. [6]
- (d) Discuss why designers of products, such as the electric vacuum cleaner, use the basic control principles of input, output, feed-back and amplification to demonstrate how their ideas will function. 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 a person gardening and a range of gardening equipment.

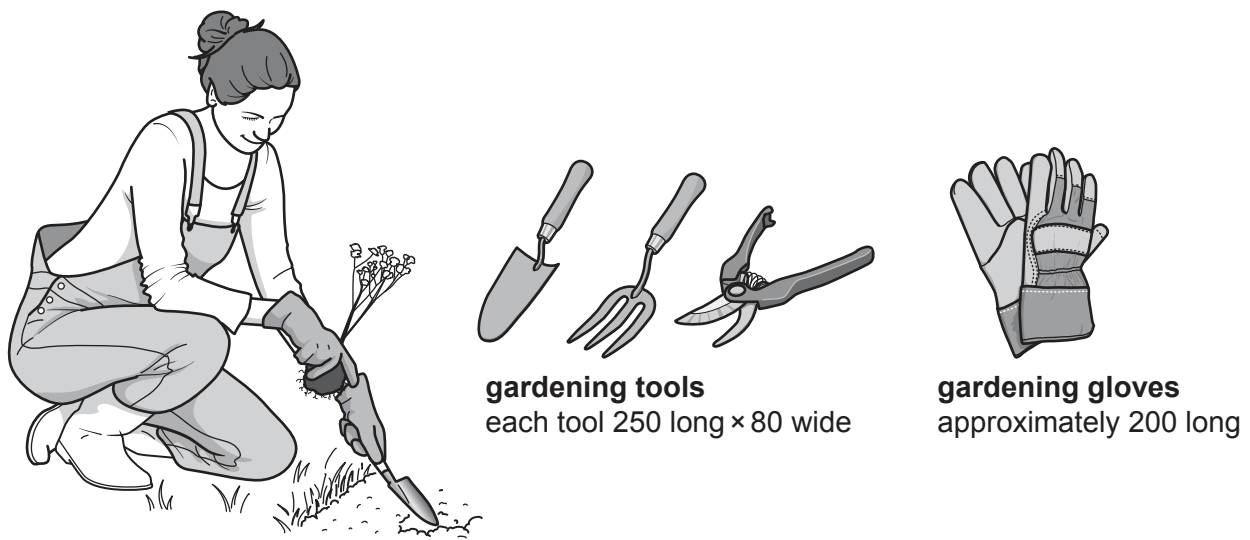
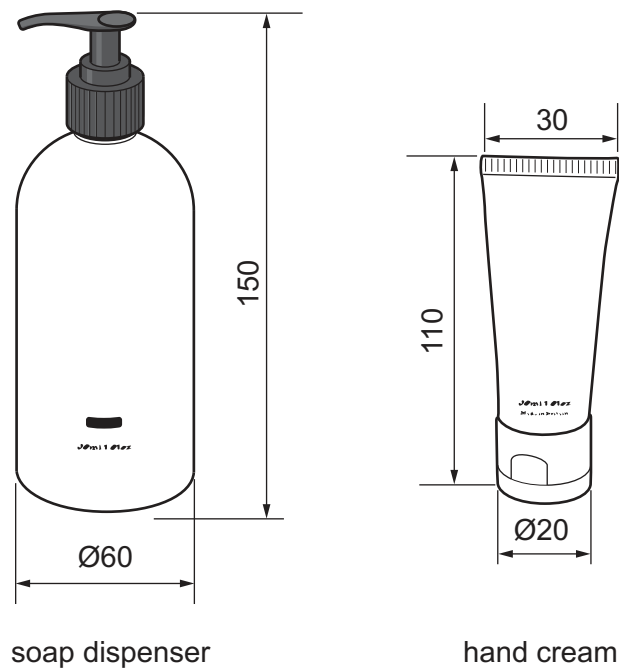


Fig. 7.1

- (a) Use notes and sketches to **develop** a design for a gardening aid. The gardening aid must:
- provide a flat surface that can be knelt on
  - have a handle to steady the user
  - be easily moved around the garden. [20]
- (b) Use notes and sketches to **develop** a design for a holder for the gardening tools that attaches to the gardening aid designed in **part (a)**. The tools must be easily removed from the holder. [20]
- (c) Use notes and sketches to **develop** a design for a container for garden rubbish that attaches to the gardening aid designed in **part (a)**. The container must include a place for the gardening gloves. [20]
- (d) Produce a pictorial (3D) rendered drawing of the complete gardening aid which shows all of the features that you have designed in **parts (a)–(c)**. [20]



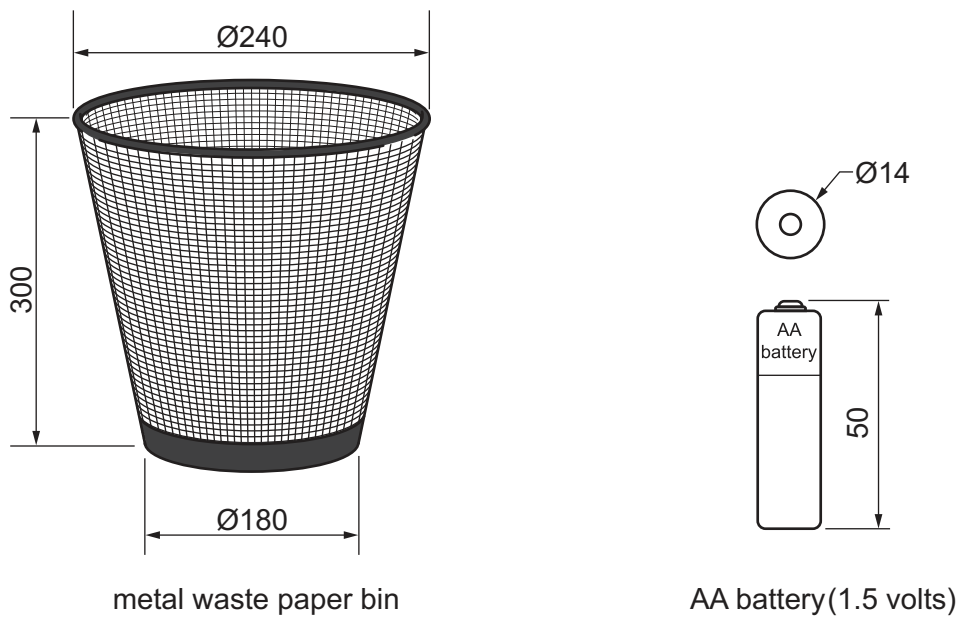
8 Fig. 8.1 shows two products that are to be packaged in a hand care gift set.



**Fig. 8.1**

- (a) Use notes and sketches to **develop** a design for a brand for the hand care gift set based upon the name 'SoSoft'. [20]
- (b) Use notes and sketches to **develop** a design for a plastic tray to hold the two products that are to be packaged in the hand care gift set. [20]
- (c) Use notes and sketches to **develop** a design for a one-piece development (net) for a package that holds the plastic tray, including the two products, designed in **part (b)**. [20]
- (d) Produce a pictorial (3D) rendered drawing of the complete package for the hand care gift set which shows all of the features that you have designed in **parts (a)–(c)**. [20]

- 9 Fig. 9.1 shows a metal waste paper bin and the sizes of an AA battery. A paper shredder is to be attached to the top of the waste paper bin.



**Fig. 9.1**

- (a) Use notes and sketches to **develop** a design for a mechanism that will shred paper. The mechanism must be powered by four AA size batteries. [20]
- (b) Use notes and sketches to **develop** a design for a case for the paper shredder that will house the mechanism designed in **part (a)**. The case must allow the four AA size batteries to be easily replaced. [20]
- (c) Use notes and sketches to **develop** a design for a clamping device to hold the paper shredder designed in **part (b)** onto the metal waste paper bin. The paper shredder must easily be removed to empty the waste paper bin. [20]
- (d) Produce a pictorial (3D) rendered drawing of the paper shredder which shows all of the features that you have designed in **parts (a)–(c)**. [20]



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