



## Cambridge International AS & A Level

---

DESIGN & TECHNOLOGY

9705/13

Paper 1

October/November 2022

MARK SCHEME

Maximum Mark: 120

---

**Published**

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge International will not enter into discussions about these mark schemes.

Cambridge International is publishing the mark schemes for the October/November 2022 series for most Cambridge IGCSE™, Cambridge International A and AS Level components and some Cambridge O Level components.

---

This document consists of **22** printed pages.

**PUBLISHED****Generic Marking Principles**

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptors for a question. Each question paper and mark scheme will also comply with these marking principles.

**GENERIC MARKING PRINCIPLE 1:**

Marks must be awarded in line with:

- the specific content of the mark scheme or the generic level descriptors for the question
- the specific skills defined in the mark scheme or in the generic level descriptors for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

**GENERIC MARKING PRINCIPLE 2:**

Marks awarded are always **whole marks** (not half marks, or other fractions).

**GENERIC MARKING PRINCIPLE 3:**

Marks must be awarded **positively**:

- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
- answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.

**GENERIC MARKING PRINCIPLE 4:**

Rules must be applied consistently, e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

**GENERIC MARKING PRINCIPLE 5:**

Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen).


**GENERIC MARKING PRINCIPLE 6:**

Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind.

**PUBLISHED**

Question	Answer	Marks	Guidance
<b>Section A</b>			
1(a)	Exemplar answer Medium-carbon steel [1] Chromium plated [1]  <b>0–2</b>	<b>2</b>	AOVR including: High-carbon steel Spring steel
1(b)(i)	Sketches and/or notes show: <b>Marking out and drilling</b> Suitable method [3] Tools, equipment or processes [2] Safety precaution [1]  <b>0–6</b>	<b>6</b>	Accept hand or CNC methods. Exemplar answer: <ul style="list-style-type: none"> <li>• Mark centre of hole</li> <li>• Drill</li> </ul>
1(b)(ii)	Sketches and/or notes show: <b>Cutting out and finishing the edges</b> Suitable method [3] Tools, equipment or processes [2] Safety precaution [1]  <b>0–6</b>	<b>6</b>	Accept hand or CNC methods. Exemplar answer: <ul style="list-style-type: none"> <li>• Cut out with abra file</li> <li>• Smooth edges with file, wet and dry and polish</li> </ul>
1(c)	Sketches and/or notes show: Suitable method identified for adding name e.g. self-adhesive vinyl sticker Description of method [0–3] Tools and/or equipment named [0–3]  <b>0–6</b>	<b>6</b>	Accept hand or CNC methods. Exemplar answers: <ul style="list-style-type: none"> <li>• Adding sticker</li> <li>• Engraving</li> </ul>

**PUBLISHED**

Question	Answer	Marks	Guidance
2(a)	Exemplar answer: Top and bottom layer [1]  Corrugations [1]  <b>0–2</b>	<b>2</b>	AOVR
2(b)(i)	Sketches and/or notes show: <b>Cut out and Joined</b> Suitable method [3] Tools, equipment or processes [2] Safety precaution [1]  <b>0–6</b>	<b>6</b>	Accept hand or CNC methods. Exemplar answer: <ul style="list-style-type: none"> <li>• Cut out with craft knife</li> <li>• Joined with tabs</li> </ul>
2(b)(ii)	Sketches and/or notes show: <b>Making the label and adding image to label</b> Suitable method [3] Tools, equipment or processes [2] Safety precaution [1]  <b>0–6</b>	<b>6</b>	Accept hand or CNC methods. Exemplar answer: <ul style="list-style-type: none"> <li>• Cut out with craft knife</li> <li>• Image drawn onto the label</li> </ul>
2(c)	Sketches and notes show: Shape/surfaces of development for Part B [0–3] Joining tabs [0–2] Fold and cut lines [0–1]  <b>0–6</b>	<b>6</b>	

**PUBLISHED**

Question	Answer	Marks	Guidance
3(a)	Exemplar answers: Tension [1] Arrows $\longleftrightarrow$ or notes show tension [1]  <b>0–2</b>	<b>2</b>	
3(b)(i)	Sketches and/or notes show: <b>Marking out holes</b> Suitable method [1] Tools, equipment or processes [1] Safety precaution [1] <b>Cutting out holes</b> Suitable method [1] Tools, equipment or processes [1] Safety precaution [1]  <b>0–6</b>	<b>6</b>	Accept hand or CNC methods. Exemplar answer: <ul style="list-style-type: none"> <li>• Mark out</li> <li>• Drill holes and cut out with fret saw</li> </ul>
3(b)(ii)	Sketches and notes show: Suitable method e.g. slots [0–2] Tools, equipment or processes [0–2] Safety precaution [0–2]  <b>0–6</b>	<b>6</b>	Accept hand or CNC methods. Exemplar answers: <ul style="list-style-type: none"> <li>• Slots</li> <li>• Blocks and screws</li> </ul>
3(c)	Sketches and/or notes show: Suitable mechanism for raising the platform [1] and locking in position [1] Description of method [0–3] Tools and/or equipment named [0–2]  <b>0–6</b>	<b>6</b>	Accept hand or CNC methods. Exemplar answers: <ul style="list-style-type: none"> <li>• Ratchet system</li> <li>• Peg with holes</li> </ul>

**PUBLISHED**

Question	Answer	Marks	Guidance
<b>Section B</b>			
4(a)	Feature X is designed to hang the rack [1] on a rail [1]  <b>0–2</b>	<b>2</b>	
4(b)	Problem one identified [1] and described [1] Problem two identified [1] and described [1] e.g. No sides on shelves [1] so products will fall off[1]  <b>0–4</b>	<b>4</b>	Other acceptable answers include: <ul style="list-style-type: none"> <li>• Made of mild steel – will rust</li> <li>• 3 Solid shelf with rim – water collects</li> <li>• Shelves not supported</li> </ul>
4(c)	Explanation of how problem one could be overcome [0–3] Explanation of how problem two could be overcome [0–3] e.g. add a rim [1] when making the tray [1] by pressing [1]  <b>0–6</b>	<b>6</b>	
4(d)(i)	Situation has been analysed and relevant issues/points identified Benefits of self-assembly products e.g. cheaper as no assembly costs [1] easier to transport as more compact [1], can be dismantled for moving [1]  <b>0–3</b>	<b>3</b>	
4(d)(ii)	Clear and appropriate explanations of why issues/points are considered relevant e.g. price is an important factor when purchasing a product [1], people like to take products home rather than wait for a delivery [1], people move to a new house and take their products with them [1]  <b>0–3</b>	<b>3</b>	

**PUBLISHED**

Question	Answer	Marks	Guidance
4(d)(iii)	Specific examples/evidence used to support conclusions e.g. many large flat pack furniture companies [1], development of CKD fittings [1]  <b>0–2</b>	<b>2</b>	

Question	Answer	Marks	Guidance
5(a)	Feature X is a additional feature that [1] adds interest to the product [1]  <b>0–2</b>	<b>2</b>	Aesthetics
5(b)	Problem one identified [1] and described [1] Problem two identified [1] and described [1] e.g. base the wrong shape [1] so the sides won't fit [1]  <b>0–4</b>	<b>4</b>	Other acceptable problems include: <ul style="list-style-type: none"> <li>• No slots on sides</li> <li>• Top of back incorrect shape</li> <li>• No dividers or too low – pencils fall over</li> </ul>
5(c)	Explanation of how problem one could be overcome [0–3] Explanation of how problem two could be overcome [0–3] e.g. shape of base changed [1] correct number of slots [1] and tabs [1] added to match sides  <b>0–6</b>	<b>6</b>	
5(d)(i)	Situation has been analysed and relevant issues/points identified e.g. maintains sales levels [1], to match existing decoration/furniture [1] products can be designed for different target markets [1]  <b>0–3</b>	<b>3</b>	



**PUBLISHED**

<b>Question</b>	<b>Answer</b>	<b>Marks</b>	<b>Guidance</b>
5(d)(ii)	Clear and appropriate explanations of why issues/points are considered relevant e.g. profits based on volume of sales [1] customers tend to buy products to match with what they already own [1], different versions of a product broaden potential sales [1]  <b>0–3</b>	<b>3</b>	
5(d)(iii)	Specific examples/evidence used to support conclusions e.g. grey has recently become a very popular colour for products [1], products can have images of popular sports stars added [1]  <b>0–2</b>	<b>2</b>	

<b>Question</b>	<b>Answer</b>	<b>Marks</b>	<b>Guidance</b>
6(a)	Feature X is a handle [1] to raise the table [1]  <b>0–2</b>	<b>2</b>	
6(b)	Problem one identified [1] and described [1] Problem two identified [1] and described [1] e.g. No brakes [1] so table will move [1]  <b>0–4</b>	<b>4</b>	Other acceptable answers include: <ul style="list-style-type: none"> <li>• Tin not a suitable metal</li> <li>• No edge to the table</li> <li>• No bracing</li> <li>• No pivot to mechanism</li> </ul>
6(c)	Explanation of how problem one could be overcome [0–3] Explanation of how problem two could be overcome [0–3] e.g. Add two [1] brakes [1] to the wheels on the lifting table [1]  <b>0–6</b>	<b>6</b>	

**PUBLISHED**

<b>Question</b>	<b>Answer</b>	<b>Marks</b>	<b>Guidance</b>
6(d)(i)	Situation has been analysed and relevant issues/points identified e.g. the number to be produced determines the production method [1] for larger production runs materials can be purchased in bulk [1] jigs and formers can speed up production [1]  <b>0–3</b>	<b>3</b>	
6(d)(ii)	Clear and appropriate explanations of why issues/points are considered relevant e.g. a one off product is made in a different way to a high volume production run [1], it is cheaper to purchase materials in bulk [1], cost of jigs and formers only justified for larger production runs [1]  <b>0–3</b>	<b>3</b>	
6(d)(iii)	Specific examples/evidence used to support conclusions e.g. car production lines [1], food production and packaging [1]  <b>0–2</b>	<b>2</b>	



Question	Answer	Marks	Guidance
7(b)	<p><b>Cover to protect from the weather</b>  One pre-conceived idea presented <b>0–2</b>  OR The development and selection of a range of ideas into a single design proposal which would appear to work but lacks some technical detail <b>3–4</b>  OR The development and selection of a range of ideas into a single design proposal which would appear to technical detail to show that the proposed solution would clearly work <b>5–6</b>  e.g. clear acrylic sheet</p> <p><b>Easily changed</b>  One pre-conceived idea presented <b>0–2</b>  OR The development and selection of a range of ideas into a single design proposal which would appear to work but lacks some technical detail <b>3–4</b>  OR The development and selection of a range of ideas into a single design proposal which would appear to technical detail to show that the proposed solution would clearly work <b>5–6</b>  e.g. acrylic hinged</p> <p><b>Overall total given as 0–4 (lower), 5–8 (mid), 9–12 (high)</b></p> <p>Clarity and quality of sketching and explanatory notes <b>0–4</b>  Evaluation (reasons for selection) <b>0–4</b></p>	20	<p><b>Example</b></p>          <p><b>Example</b></p>

<b>Question</b>	<b>Answer</b>	<b>Marks</b>	<b>Guidance</b>
7(c)	<p><b>Water bottle holder</b> One pre-conceived idea presented <b>0–2</b> OR The development and selection of a range of ideas into a single design proposal which would appear to work but lacks some technical detail <b>3–4</b> OR The development and selection of a range of ideas into a single design proposal which would appear to technical detail to show that the proposed solution would clearly work <b>5–6</b></p> <p>e.g. spring clip</p> <p><b>Attaches to back of noticeboard</b> One pre-conceived idea presented <b>0–2</b> OR The development and selection of a range of ideas into a single design proposal which would appear to work but lacks some technical detail <b>3–4</b> OR The development and selection of a range of ideas into a single design proposal which would appear to technical detail to show that the proposed solution would clearly work <b>5–6</b></p> <p>e.g. rivetted to noticeboard</p> <p><b>Overall total given as 0–4 (lower), 5–8 (mid), 9–12 (high)</b></p> <p>Clarity and quality of sketching and explanatory notes <b>0–4</b> Evaluation (reasons for selection) <b>0–4</b></p>	20	<p><b>Example</b></p> <p><b>Example</b></p>

**PUBLISHED**

<b>Question</b>	<b>Answer</b>	<b>Marks</b>	<b>Guidance</b>
7(d)	<p>The drawing will exhibit a reasonable standard of outcome and show some of the required design features <b>0–5</b></p> <p>OR The drawing will exhibit a good standard of outcome and show most of the design features required to make the product function as intended <b>6–9</b></p> <p>OR The drawing will be completed to a high standard of outcome and fully shows the design features required to make the product function as intended <b>0–14</b></p> <p>Some use made of colour and tone to enhance the visual impact of the drawing <b>0–2</b></p> <p>OR</p> <p>Good use has been made of colour and tone to enhance the visual impact of the drawing <b>3–4</b></p> <p>OR Very good use has been made of colour, tone and material representation to enhance the visual impact of the drawing <b>5–6</b></p>	<b>20</b>	



**PUBLISHED**

Question	Answer	Marks	Guidance
8(b)	<p><b>Novelty item</b></p> <p>One pre-conceived idea presented <b>0–2</b>  OR The development and selection of a range of ideas into a single design proposal which would appear to work but lacks some technical detail <b>3–4</b>  OR The development and selection of a range of ideas into a single design proposal which would appear to technical detail to show that the proposed solution would clearly work <b>5–6</b></p> <p>e.g. Key fob</p> <p><b>Encourages children to save energy</b></p> <p>One pre-conceived idea presented <b>0–2</b>  OR The development and selection of a range of ideas into a single design proposal which would appear to work but lacks some technical detail <b>3–4</b>  OR The development and selection of a range of ideas into a single design proposal which would appear to technical detail to show that the proposed solution would clearly work <b>5–6</b></p> <p>e.g. Slogan e.g. <i>Turn off appliances after use</i></p> <p><b>Overall total given as 0–4 (lower), 5–8 (mid), 9–12 (high)</b></p> <p>Clarity and quality of sketching and explanatory notes <b>0–4</b>  Evaluation (reasons for selection) <b>0–4</b></p>	20	<p><b>Example</b></p> <p><b>Example</b></p>





**PUBLISHED**

<b>Question</b>	<b>Answer</b>	<b>Marks</b>	<b>Guidance</b>
8(d)	<p>The drawing will exhibit a reasonable standard of outcome and show some of the required design features <b>0–5</b></p> <p>OR The drawing will exhibit a good standard of outcome and show most of the design features required to make the product function as intended <b>6–9</b></p> <p>OR The drawing will be completed to a high standard of outcome and fully show the design features required to make the product function as intended <b>0–14</b></p> <p>Some use made of colour and tone to enhance the visual impact of the drawing <b>0–2</b></p> <p>OR</p> <p>Good use has been made of colour and tone to enhance the visual impact of the drawing <b>3–4</b></p> <p>OR Very good use has been made of colour, tone and material representation to enhance the visual impact of the drawing <b>5–6</b></p>	<b>20</b>	

**PUBLISHED**

Question	Answer	Marks	Guidance
9(a)	<p><b>Attaches to rail</b></p> <p>One pre-conceived idea presented 0–2</p> <p>OR The development and selection of a range of ideas into a single design proposal which would appear to work but lacks some technical detail 3–4</p> <p>OR The development and selection of a range of ideas into a single design proposal which would appear to technical detail to show that the proposed solution would clearly work 5–6</p> <p>e.g. clamp</p> <p><b>Height adjustable</b></p> <p>One pre-conceived idea presented 0–2</p> <p>OR The development and selection of a range of ideas into a single design proposal which would appear to work but lacks some technical detail 3–4</p> <p>OR The development and selection of a range of ideas into a single design proposal which would appear to technical detail to show that the proposed solution would clearly work 5–6</p> <p>e.g. screw thread, clamp</p> <p><b>Overall total given as 0–4 (lower), 5–8 (mid), 9–12 (high)</b></p> <p>Clarity and quality of sketching and explanatory notes 0–4</p> <p>Evaluation (reasons for selection) 0–4</p>	20	<p><b>Example</b></p>          <p><b>Example</b></p>





**PUBLISHED**

<b>Question</b>	<b>Answer</b>	<b>Marks</b>	<b>Guidance</b>
9(d)	<p>The drawing will exhibit a reasonable standard of outcome and show some of the required design features <b>0–5</b></p> <p>OR The drawing will exhibit a good standard of outcome and show most of the design features required to make the product function as intended <b>6–9</b></p> <p>OR The drawing will be completed to a high standard of outcome and fully shows the design features required to make the product function as intended <b>0–14</b></p> <p>Some use made of colour and tone to enhance the visual impact of the drawing <b>0–2</b></p> <p>OR</p> <p>Good use has been made of colour and tone to enhance the visual impact of the drawing <b>3–4</b></p> <p>OR Very good use has been made of colour, tone and material representation to enhance the visual impact of the drawing <b>5–6</b></p>	<b>20</b>	