



Cambridge International AS & A Level

DESIGN & TECHNOLOGY

9705/12

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.

PUBLISHED**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.

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Question	Answer	Marks	Guidance
Section A			
1(a)	Exemplar answers: Provides a smooth surface [1] Available in a wide range of colours/patterns [1] 0–2	2	AOVR including: <ul style="list-style-type: none"> • Hygienic • Hardwearing
1(b)(i)	Sketches and notes show: Suitable method e.g. cam fitting [0–3] Tools, equipment or processes [0–2] Safety precautions [0–1] 0–6	6	Other suitable joints: <ul style="list-style-type: none"> • plastic blocks • screw fittings • <i>If not a KD joint then can still award Tools/equip/safety</i>
1(b)(ii)	Sketches and notes show: Suitable method e.g. grooves [0–3] Tools, equipment or processes [0–2] Safety precautions [0–1] 0–6	6	Suitable methods include: <ul style="list-style-type: none"> • Grooves • Rebates • Blocks or strips • Dowels • Screws/nails/pins
1(c)	Sketches and/or notes show: Method attaches handle to drawer front [2] In a temporary fashion [2] Tools used (2) 0–6	6	Suitable methods include: <ul style="list-style-type: none"> • Machine screws • Nuts and bolts

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Question	Answer	Marks	Guidance
2(a)	Exemplar answers: Water resistant [1] Can be moulded into a complex shape [1] 0–2	2	AOVR include: <ul style="list-style-type: none"> • Can be wiped cleaned • Flexible so wont snap • Nontoxic
2(b)(i)	Sketches and/or notes show: Mark out and cut out Suitable method [3] Tools, equipment or processes [2] Safety precaution [1] 0–6	6	Suitable methods include: <ul style="list-style-type: none"> • Hand – craft knife, cutting mat... • CAD/CAM
2(b)(ii)	Sketches and/or notes show: Method for joining, method for resealing [3] Tools, equipment or processes [0–2] Safety precaution [1] 0–6	6	Suitable method of joining include: <ul style="list-style-type: none"> • Staples • Adhesive. Suitable method of resealing: <ul style="list-style-type: none"> • Velcro, • low tac adhesive
2(c)	Sketches and notes show: Suitable method [3] Description of process [0–3] 0–6	6	Suitable methods include: <ul style="list-style-type: none"> • lithography • digital printing Do not accept drawing by hand as a suitable method but award marks for description and tools, equipment and processes.

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Question	Answer	Marks	Guidance
3(a)	Exemplar answers: Improves grip [1] Feels better to the touch [1] 0–2	2	AOVR including: <ul style="list-style-type: none"> • Aesthetics or ergonomics • Identification
3(b)(i)	Sketches and/or notes show: Forging or casting Method [3] Tools, equipment or processes [2] Safety precaution [1] 0–6	6	Method should include heat and pouring/force. Tools should include heat source and appropriate tools. Safety should include PPE.
3(c)(i)	Sketches and/or notes show: Lever named [1] Variable pivot [1] Moving parts identified [1] Description [0–3] 0–6	6	
3(c)(ii)	Sketches and/or notes show: Worm gear named [1] Conversion of rotary to linear motion [1] Moving parts identified [1] Description [0–3] 0–6	6	

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Question	Answer	Marks	Guidance
Section B			
4(a)	Feature X is a rolled edge [1] that gives strength to the hopper [1] 0–2	2	Also accept answers that focus on it being a safety feature.
4(b)	Problem one identified [1] and described [1] Problem two identified [1] and described [1] e.g. No back to the tray [1] so garden rubbish will fall out [1] 0–4	4	Other acceptable answers include: <ul style="list-style-type: none"> • No grips on the handles • Tyre too thin • Frame not structurally sound
4(c)	Explanation of how problem one could be overcome [0–3] Explanation of how problem two could be overcome [0–3] e.g. Change the shape of the mould [1] used to make the tray [1] so that a back is included [1] 0–6	6	
4(d)(i)	Situation has been analysed and relevant issues/points identified e.g. different materials have different properties [1] products need to perform well [1] over engineering is not cost effective [1] 0–3	3	
4(d)(ii)	Clear and appropriate explanations of why issues/points are considered relevant e.g. materials must be fit for purpose [1], incorrect selection of materials will result in poor performing products [1], destructive testing shows the limits of the material [1] 0–3	3	

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Question	Answer	Marks	Guidance
4(d)(iii)	Specific examples/evidence used to support conclusions e.g. manufactures have materials testing facilities [1], manufactures examine products that have failed [1] 0–2	2	

Question	Answer	Marks	Guidance
5(a)	Feature X is a rail that holds [1] the flexible vinyl to the correct width [1] 0–2	2	
5(b)	Problem one identified [1] and described [1] Problem two identified [1] and described [1] e.g. no carry bag [1] for parts to fit into 1 0–4	4	Other acceptable problems include: <ul style="list-style-type: none"> • No back support to hold sign upright • No graphics on the vinyl • Larger base to avoid being blown over by the wind
5(c)	Explanation of how problem one could be overcome [0–3] Explanation of how problem two could be overcome [0–3] e.g. make a bag [1] so the long metal pieces can fit in [1] and the vinyl can be rolled or folded to fit in [1] 0–6	6	
5(d)(i)	Situation has been analysed and relevant issues/points identified e.g. advertising influences people to buy [1], role models can influence people to buy healthy products [1] advertising can increase sales of products [1] 0–3	3	

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Question	Answer	Marks	Guidance
5(d) (ii)	Clear and appropriate explanations of why issues/points are considered relevant e.g. sometimes people will buy things they can't afford and get into debt [1] sporting superstars used to advertise products [1], ethical actions v profit from sales [1] 0–3	3	
5(d)(iii)	Specific examples/evidence used to support conclusions e.g. advertising has encouraged many young people to take up smoking and drinking [1], government advertising campaigns can encourage people to be vaccinated against disease [1] 0–2	2	

Question	Answer	Marks	Guidance
6(a)	Feature X is designed to provide a stable base [1] so the fan won't fall over when in use [1] 0–2	2	
6(b)	Problem one identified [1] and described [1] Problem two identified [1] and described [1] e.g. No cover over the fan blade [1] so it would be dangerous [1] 0–4	4	Other acceptable answers include: <ul style="list-style-type: none"> • No plug • No switches

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Question	Answer	Marks	Guidance
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 a cover [1] over the fan blade [1] that allows air to pass through [1] 0–6	6	
6(d)(i)	Situation has been analysed and relevant issues/points identified Limits the life of the product [1], reduces the need for replacement parts [1] and products will always be relatively new [1] 0–3	3	
6(d)(ii)	Clear and appropriate explanations of why issues/points are considered relevant e.g. promotes new sales as people will need to buy a new product [1], avoids costly repairs [1] and products include the latest technology [1], 0–3	3	
6(d)(iii)	Specific examples/evidence used to support conclusions e.g. length of guarantees [1], products designed to be dismantled and recycled rather than repaired [1] 0–2	2	

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Question	Answer	Marks	Guidance
Section C			
7(a)	<p>Spice jar holder</p> <p>One pre-conceived idea presented 0–4</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 5–8</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 9–12</p> <p>Holds six spice bottles must be included to access 10–12marks</p> <p>Clarity and quality of sketching and explanatory notes 0–4</p> <p>Evaluation (reasons for selection) 0–4</p>	20	

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Question	Answer	Marks	Guidance
7(b)	<p>Method of identification for visually impaired</p> <p>One pre-conceived idea presented 0–2 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 OR The development and selection of a range of ideas into a single design proposal which has technical detail to show that the proposed solution would clearly work 5–6 e.g. raised letters, moulding letters into the lid, braille, large letters, bright colours</p> <p>Identify the spice in each jar</p> <p>One pre-conceived idea presented 0–2 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 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 e.g. first letter of the name of each spice moulded into the lid</p> <p>Overall total given as 0–4 (lower), 5–8 (mid), 9–12 (high)</p> <p>Clarity and quality of sketching and explanatory notes 0–4 Evaluation (reasons for selection) 0–4</p>	20	

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Question	Answer	Marks	Guidance
7(c)	<p>Method of fastening rack to inside of door</p> <p>One pre-conceived idea presented 0–2 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 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. metal bracket</p> <p>Height adjustable</p> <p>One pre-conceived idea presented 0–2 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 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. spice rack mounted on vertical runners</p> <p>Overall total given as 0–4 (lower), 5–8 (mid), 9–12 (high)</p> <p>Clarity and quality of sketching and explanatory notes 0–4 Evaluation (reasons for selection) 0–4</p>	20	

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

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Question	Answer	Marks	Guidance
8(a)	<p>Instruction leaflet shows how to use the adhesive</p> <p>One pre-conceived idea presented 0–2 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 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. A4 tri-fold leaflet</p> <p>Uses pictures and not words</p> <p>One pre-conceived idea presented 0–2 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 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. simple images used</p> <p>Overall total given as 0–4 (lower), 5–8 (mid), 9–12 (high)</p> <p>Clarity and quality of sketching and explanatory notes 0–4 Evaluation (reasons for selection) 0–4</p>	20	

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Question	Answer	Marks	Guidance
8(b)	<p>Package holds the tubes of adhesive and spatula</p> <p>One pre-conceived idea presented 0–2 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 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. blister pack</p> <p>Environmentally friendly (needs to be clear)</p> <p>One pre-conceived idea presented 0–2 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 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. made of recycled card</p> <p>Overall total given as 0–4 (lower), 5–8 (mid), 9–12 (high)</p> <p>Clarity and quality of sketching and explanatory notes 0–4 Evaluation (reasons for selection) 0–4</p>	20	

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Question	Answer	Marks	Guidance
8(c)	<p>Brand name</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. Supastick</p> <p>Colour scheme</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. yellow and blue</p> <p>Overall total given as 0–4 (lower), 5–8 (mid), 9–12 (high)</p> <p>Clarity and quality of sketching and explanatory notes 0–4</p> <p>Evaluation (reasons for selection) 0–4</p>	20	

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Question	Answer	Marks	Guidance
8(d)	<p>The drawing will exhibit a reasonable standard of outcome and show some of the required design features 0–5</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 6–9</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 10–14</p> <p>Some use made of colour and tone to enhance the visual impact of the drawing 0–2</p> <p>OR</p> <p>Good use has been made of colour and tone to enhance the visual impact of the drawing 3–4</p> <p>OR Very good use has been made of colour, tone and material representation to enhance the visual impact of the drawing 5–6</p>	20	

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Question	Answer	Marks	Guidance
9(a)	<p>Freestanding frame</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. made from tubular metal</p> <p>Allows chair to swing from the rope</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. arm extends over the top of the frame</p> <p>Overall total given as 0–4 (lower), 5–8 (mid), 9–12 (high)</p> <p>Clarity and quality of sketching and explanatory notes 0–4</p> <p>Evaluation (reasons for selection) 0–4</p>	20	

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Question	Answer	Marks	Guidance
9(b)	<p>Fastens to the ground</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. plate with pegs that hammer into the ground</p> <p>Can easily be moved</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. mallet has an end that allows the pegs to be easily pulled out of the ground</p> <p>Overall total given as 0–4 (lower), 5–8 (mid), 9–12 (high)</p> <p>Clarity and quality of sketching and explanatory notes 0–4</p> <p>Evaluation (reasons for selection) 0–4</p>	20	

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Question	Answer	Marks	Guidance
9(c)	<p>Fastens rope to frame</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. hook and eye</p> <p>Height adjustable</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. winch</p> <p>Overall total given as 0–4 (lower), 5–8 (mid), 9–12 (high)</p> <p>Clarity and quality of sketching and explanatory notes 0–4</p> <p>Evaluation (reasons for selection) 0–4</p>	20	

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9(d)	<p>The drawing will exhibit a reasonable standard of outcome and show some of the required design features 0–5</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 6–9</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 0–14</p> <p>Some use made of colour and tone to enhance the visual impact of the drawing 0–2</p> <p>OR</p> <p>Good use has been made of colour and tone to enhance the visual impact of the drawing 3–4</p> <p>OR Very good use has been made of colour, tone and material representation to enhance the visual impact of the drawing 5–6</p>	20	