Cambridge Assessment International Education

Cambridge International AS & A Level

DESIGN & TECHNOLOGY **9705/12**

Paper 1 **October/November 2023**

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 2023 series for most Cambridge IGCSE, Cambridge International A and AS Level components, and some Cambridge O Level components.

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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**:

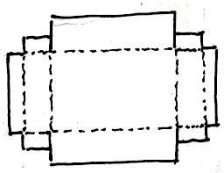
- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can 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.

Question	Answer	Marks	Guidance
Section A			
1(a)	Exemplar answers: Environmentally friendly so creates a good image for the manufacturer [1] Relatively cheap to buy and readily available [1] **0–2**	**2**	AOVR include: • easy to cut to shape
1(b)(i)	Sketches and/or notes show: Set out on 180 mm centres and cutting out the hole Suitable method [0–3] e.g. marking out, templates Tools, equipment or processes Suitable method [0–2] e.g. pencil, rule, hole saw. Safety precaution [0–1] **0–6**	**6**	Accept hand and CAD/CAM methods.
1(b)(ii)	Prepared and application of a finish Suitable method [0–3] e.g. edges cleaned up, surfaces sanded, sealed Tools, equipment or processes Suitable finish [0–2] e.g. glasspaper, varnish, paint Safety precaution [0–1] **0–6**	**6**	Accept hand and CAD/CAM methods.
1(c)	Sketches and/or notes show: Temporary methods of joining Part A to Part B Suitable method and description [0–3] × 2 e.g. screw mechanisms using an insert **0–6**	**6**	Friction fit, screw mechanisms, end cap that pushed into the tube, extend the tube and push a rod through.

Question	Answer	Marks	Guidance
2(a)	Exemplar answers: Allows water to drain away [1] Can be used to lift the crate [1] **0–2**	**2**	AOVR including: • allows air to get to the vegetables to prevent rotting
2(b)	Sketches and/or notes show: Shape of development (net) Any shape development shown [1] or correct shape to make a crate [2] One piece development for a crate with some fold and cut lines [3] or all fold lines (including consideration of thickness of material) and cut lines [4] Correct shape one piece development with some tabs and flaps/joining method [5] or all tabs and flaps/joining method clearly shown [6] **0–6**	**6**	Ignore the holes in the crate. Example of a development (net) 
2(c)	Sketches and notes show: Cutting and then folding to shape Suitable method [0–3] e.g. mark, score, indent, cut one side, fold, accuracy Tools, equipment or processes Suitable method [0–2] e.g. pencil, craft knife, safety rule, Safety precaution [0– 1] **0–6**	**6**	Accept hand or CNC methods.

Question	Answer	Marks	Guidance
2(d)	Sketches and/or notes show: Methods of designing and making a label Suitable method and explanation [0–3] e.g. CAD and then printing, changeable parts, wipe clean Explanation of how it can be updated [0–3] **0–6**	**6**	

Question	Answer	Marks	Guidance
3(a)	Exemplar answer: To show a principle [1] To check it works [1] **0–2**	**2**	AOVR include: • to see what it looks like three dimensionally. • Test and evaluate. • Develop the model from the evaluation.
3(b)	Sketches and/or notes show: Method of making the winding mechanism (if just the handle, not bracket, maximum 2 marks) [0–3] Tools, equipment or processes [0–2] Safety precautions [1] **0–6**	**6**	Accept hand or machine methods.
3(c)(i)	Sketches and/or notes show: Suitable method and description of process [0–3] e.g. injection moulding, laser cutting Equipment and tools [0–3] **0–6**	**6**	

Question	Answer	Marks	Guidance
3(c)(ii)	Sketches and notes show: Explanation of how a compound pulley system works [0–3] Movement [0–2] Understanding of mechanical advantage [1] **0–6**	**6**	

Question	Answer	Marks	Guidance
Section B			
4(a)	Feature X is a downpipe [1] to direct water away from the building [1] **0–2**	**2**	
4(b)	Problem one identified [1] and described [1] Problem two identified [1] and described [1] e.g. guttering on the wrong side [1] so will not collect water [1] **0–4**	**4**	Other acceptable answers include: 1 Untreated softwood will rot. 2 No door/window/floor. 3 Mild steel will rust 4 Water could collect at the base on the ground.
4(c)	Explanation of how problem one could be overcome [0–3] Explanation of how problem two could be overcome [0–3] e.g. move the guttering [1] to the low side of the roof [1] so it collects the water as it runs down the roof [1] **0–6**	**6**	
4(d)(i)	Situation has been analysed and relevant issues/points identified e.g. more easily transported [1] fully assembled products would be difficult to move into position [1], the person assembling the product can 'personalise' the product [1] **0–3**	**3**	
4(d)(ii)	Clear and appropriate explanations of why issues/points are considered relevant e.g. transport cost are high and it is not easy to transport bulky items [1], specialist lifting gear would be required [1], way in which the door hangs could be changed [1] **0–3**	**3**	

Question	Answer	Marks	Guidance
4(d)(iii)	Specific examples/evidence used to support conclusions e.g. flat pack furniture [1], ride on toys for children [1] **0–2**	**2**	

Question	Answer	Marks	Guidance
5(a)	Feature X is a slot together fastening [1] that does not require glue [1] **0–2**	**2**	
5(b)	Problem one identified [1] and described [1] Problem two identified [1] and described [1] e.g. the socks will [1] slide out of the packet [1] **0–4**	**4**	Other acceptable answers include: 1 Limited surface graphics e.g. no size, barcode. 2 All cut lines on the development (net). 3 No means of hanging the package on a rack.
5(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 thin plastic strip [1] that fastens the socks [1] to the package [1] **0–6**	**6**	
5(d)(i)	Situation has been analysed and relevant issues/points identified e.g. ensures the solution meets the need [1], to look at existing solutions to similar design problems (check the competition) [1], make sure the design meet current legislation [1] **0–3**	**3**	

Question	Answer	Marks	Guidance
5(d)(ii)	Clear and appropriate explanations of why issues/points are considered relevant e.g. very costly to produce a design that doesn't work [1], new designs should improve on existing designs [1], if products do not meet current legislation they cannot be sold [1] **0–3**	**3**	
5(d)(iii)	Specific examples/evidence used to support conclusions e.g. evolution of products such as mobile phones [1], legal cases involving products being sold that do not meet the current legislation [1] **0–2**	**2**	

Question	Answer	Marks	Guidance
6(a)	Feature X is a container [1] for water [1] **0–2**	**2**	
6(b)	Problem one identified [1] and described [1] Problem two identified [1] and described [1] e.g. no control switches [1] so cannot determine factors such as temperature or strength of coffee [1] **0-4**	**4**	Other acceptable problems include: 1 No power source. 2 Cup won't fit under the dispenser. 3 No means of filling.
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 control switches [1] that allow the machine to be switched on [1] and drink options selected [1] **0–6**	**6**	

Question	Answer	Marks	Guidance
6(d)(i)	Situation has been analysed and relevant issues/points identified e.g. people buy products that look good [1], easy to clean surfaces (functionality) [1] some inexpensive surface finishes can look expensive [1] **0–3**	**3**	
6(d)(ii)	Clear and appropriate explanations of why issues/points are considered relevant e.g. visual appearance is a major factor in selecting which product to purchase [1], stainless steel [1], chromium plated plastic looks more expensive than it costs to produce [1] **0–3**	**3**	
6(d)(iii)	Specific examples/evidence used to support conclusions e.g. many electrical products consider form over function [1], the 'touch' areas of products are made from softer/more tactile plastics [1] **0–2**	**2**	

Question	Answer	Marks	Guidance
Section C			
7(a)	**Box designed to the dimensions given** One pre-conceived idea presented. **0–4** 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** OR The development and selection of a range of ideas into a single design proposal which includes the technical detail to show that the proposed solution would clearly work. **9–12** **Locking lid must be included to access 10–12 marks** Clarity and quality of sketching and explanatory notes **0–4** Evaluation (reasons for selection) **0–4**	**20**	
7(b)	**Design for a decorative panel** One pre-conceived idea presented. **0–4** 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** OR The development and selection of a range of ideas into a single design proposal which includes the technical detail to show that the proposed solution would clearly work. **9–12** **Must be able to personalise decorative panel to access 10–12 marks** Clarity and quality of sketching and explanatory notes **0–4** Evaluation (reasons for selection) **0–4**	**20**	

Question	Answer	Marks	Guidance
7(c)	**Holds six rings** One pre-conceived idea presented. **0–4** 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** OR The development and selection of a range of ideas into a single design proposal which includes the technical detail to show that the proposed solution would clearly work. **9–12** **Must fit inside the box to access 10–12 marks** Clarity and quality of sketching and explanatory notes **0–4** Evaluation (reasons for selection) **0–4**	**20**	
7(d)	The drawing will exhibit a reasonable standard of outcome and show some of the required design features **0–5** 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** 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. **10–14** Some use made of colour and tone to enhance the visual impact of the drawing **0–2** OR Good use has been made of colour and tone to enhance the visual impact of the drawing. **3–4** OR Very good use has been made of colour, tone and material representation to enhance the visual impact of the drawing **5–6**	**20**	

Question	Answer	Marks	Guidance
8(a)	**Development (net) for a paper carrier bag** One pre-conceived idea presented. **0–4** 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** OR The development and selection of a range of ideas into a single design proposal which includes the technical detail to show that the proposed solution would clearly work. **9–12** **Paper carrier bag must fold flat to access 10–12 marks** Clarity and quality of sketching and explanatory notes **0–4** Evaluation (reasons for selection) **0–4**	**20**	
8(b)	**Logo designed** One pre-conceived idea presented. **0–4** 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** OR The development and selection of a range of ideas into a single design proposal which includes the technical detail to show that the proposed solution would clearly work. **9–12** **Logo based on the words 'GL clothes' and reflecting high quality clothes must be included to access 10–12 marks** Clarity and quality of sketching and explanatory notes **0–4** Evaluation (reasons for selection) **0–4**	**20**	

Question	Answer	Marks	Guidance
8(c)	**Handle attaches to the string handles** One pre-conceived idea presented. **0–4** 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** OR The development and selection of a range of ideas into a single design proposal which includes the technical detail to show that the proposed solution would clearly work. **9–12** **Ergonomic design/clear comfort must be included to access 10–12 marks** Clarity and quality of sketching and explanatory notes **0–4** Evaluation (reasons for selection) **0–4**	**20**	
8(d)	The drawing will exhibit a reasonable standard of outcome and show some of the required design features. **0–5** 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** 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 **10–14** Some use made of colour and tone to enhance the visual impact of the drawing **0–2** OR Good use has been made of colour and tone to enhance the visual impact of the drawing **3–4** OR Very good use has been made of colour, tone and material representation to enhance the visual impact of the drawing **5–6**	**20**	

Question	Answer	Marks	Guidance
9(a)	**Sits on a bench and holds the magnifying glass** One pre-conceived idea presented. **0–4** 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** OR The development and selection of a range of ideas into a single design proposal which includes the technical detail to show that the proposed solution would clearly work. **9–12** **Must be Adjustable to different angles to access 10–12 marks** Clarity and quality of sketching and explanatory notes **0–4** Evaluation (reasons for selection) **0–4**	**20**	
9(b)	**Holds a circuit board** One pre-conceived idea presented. **0–4** 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** OR The development and selection of a range of ideas into a single design proposal which includes the technical detail to show that the proposed solution would clearly work. **9–12** **Must not damage the components to access 10–12 marks** Clarity and quality of sketching and explanatory notes **0–4** Evaluation (reasons for selection) **0–4**	**20**	

Question	Answer	Marks	Guidance
9(c)	**Illuminates (lights up) the work** One pre-conceived idea presented. **0–4** 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** OR The development and selection of a range of ideas into a single design proposal which includes the technical detail to show that the proposed solution would clearly work. **9–12** **Attaches to part (a) must be included to access 10–12 marks** Clarity and quality of sketching and explanatory notes **0–4** Evaluation (reasons for selection) **0–4**	**20**	
9(d)	The drawing will exhibit a reasonable standard of outcome and show some of the required design features **0–5** 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** 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** Some use made of colour and tone to enhance the visual impact of the drawing **0–2** OR Good use has been made of colour and tone to enhance the visual impact of the drawing **3–4** OR Very good use has been made of colour, tone and material representation to enhance the visual impact of the drawing **5–6**	**20**	