Cambridge Assessment International Education

Cambridge IGCSE™

DESIGN & TECHNOLOGY **0445/13**

Paper 1 Product Design **October/November 2022**

MARK SCHEME

Maximum Mark: 50

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.

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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.

Performance description tables
Each question contains some marks which are awarded using the following performance description tables.

Part (c)				
Communication of ideas			**Suitable designs**	
Mark	**Performance description**		**Mark**	**Performance description**
5–6	Ideas are communicated with precision and clarity through the use of accurate drawings and reasoned annotations linked to most of the requirements.		5–6	Creative solutions which fully meet the requirements. Designs showing most aspects of construction detail.
3–4	Ideas are displayed with some clarity through clear drawings supported by annotations referring to some of the requirements.		3–4	Sensible solutions that mostly meet the requirements. Designs with moderate construction detail.
1–2	Simple drawings and limited annotations show little understanding of the requirements.		1–2	Solutions do not meet many of the requirements. Simplistic designs with little construction detail.
0	No creditable response.		0	No creditable response

Part (e)				
Quality of drawing			**Construction details**	
Mark	**Performance description**		**Mark**	**Performance Description**
4	High standard of line quality, use of colour and proportions. Appropriate techniques used that show clearly all detail.		5–6	All construction detail clear with good annotations and/or additional detail drawings as necessary.
2–3	Good line quality, use of colour and proportions. Most of the detail presented.		3–4	Most construction may be obvious from overall views or with some annotation.
1	Poor line quality and proportions. Little detail presented.		1–2	A simplistic design; little or no detail of construction used.
0	No creditable response.		0	No creditable response.

Guidance on using the performance description tables
Marking should be positive, rewarding achievement where possible but clearly differentiating across the whole range of marks available.

In approaching the assessment process, examiners should look at the work and then make a ‘best fit’ judgement as to which level statement it fits. In practice the work does not always match one level statement precisely so a judgement may need to be made between two or more level statements.

Once a 'best fit' level statement has been identified the following guide should be used to decide on a specific mark:

- Where the candidate's work **convincingly** meets the level statement, the highest mark should be awarded
- Where the candidate's work **adequately** meets the level statement, the most appropriate mark in the middle of the range should be awarded
- Where the candidate's work **just** meets the level statement, the lowest mark should be awarded.

Candidates answer **one** question, **either** 1 **or** 2 **or** 3.

Question	Answer	Marks	Guidance
1(a)	Accept any **four** additional specification points – easy to move around/easy access to tools/sharp edges safe/space for each tool/soft cutting surface/easy to store. [1 × 4]	**4**	Each specification point – 1 mark No repeats from question – hold equipment, including named items shown, used with modelling materials, include a flat surface for cutting materials... Only accept unqualified or one-word answers if relevant to this specific design problem such as safe to use, stable, used at a desk/workbench, durable, lightweight... Do **not** accept generic answers such as nice, aesthetic... Any other valid response
1(b)	Accept drawings of any **two** methods of holding items when in storage – in hole/groove/recess/hanging/in clip, paper clips, Terry clip, spring clip, dowels/pegs, hooks, slots, drawer, compartments, shelf, magnets... [2 × 2] Allow sketches of hands showing different ways of holding items.	**4**	Maximum of 2 marks for each drawing: Appropriate method (named or annotation) – 1 mark Clear drawing – 1 mark Any other valid response
1(c)	Any **three** suitable ideas. Award up to **6 marks for communication of ideas** using the 'Communication of ideas' table. Award up to **6 marks for suitable designs** using the 'Suitable designs' table.	**12**	At least **three different** ideas for maximum marks. Pro rata if fewer.
1(d)	Award up to **6 marks for evaluation** of the ideas: Evaluation [2 × 3] e.g. Advantage + disadvantage explained for each idea Selection [1] Justification[1]	**8**	Simple repeats of same points for each idea not rewarded. Specific not generic justification. Award maximum marks if only either advantage or disadvantage given for each as long as the response includes sophisticated reasoning.

Question	Answer	Marks	Guidance
1(e)	Award up to **4 marks for quality of drawing** using the 'Quality of drawing' table. Award up to **2 marks for dimensions:** 2 or 3 overall dimensions only – **1 mark** Additional detail dimensions – **1 mark** Award up to **6 marks for construction detail** using the 'Construction details' table.	**12**	Additional detail dimensions might show thickness of materials, diameters, etc.
1(f)	Accept any **two** suitable **specific** materials. [1 × 2] Accept any **appropriate** reason for choice of **each** material [1 × 2]	**4**	Each suitable specific material – 1 mark Generic terms such as wood, metal, plastic **not** accepted. Appropriate reason for each material – 1 mark Materials must be appropriate for the design shown in **(e)**
1(g)	Accept any suitable manufacturing process. [1 × 1]	**1**	Process must be appropriate for design in **(e)**.
	Award up to **3 marks for description of process**.	**3**	Detailed description for 3 marks
	Award up to **2 marks for names of tools, equipment of machines used**.	**2**	Basic marking out tools, such as pencil or rule, or just drawings of tools/equipment = 1 mark only **Not** materials or resources such as PVA, glasspaper, screws...
OR			

Question	Answer	Marks	Guidance
2(a)	Accept any **four** additional specification points – different materials identified/labelled/covers to contain materials/fits on work surface/stands on floor/stable in use/easy to empty/materials cannot mix. [1 × 4]	**4**	Each specification point – 1 mark No repeats from question – collects small offcuts, for use with different materials, for use in a graphics studio, made from lightweight materials, delivered flat pack... Only accept unqualified or one-word answers if relevant to this specific design problem such as sturdy, stable, can be emptied, portable, has compartments... Do **not** accept generic answers such as looks nice, waterproof, safe to use... Any other valid response
2(b)	Accept drawings of any **two** temporary joints **–** locking slots/'velcro'/twisted wire/bifurcated rivet/low tac adhesive tape/comb binder/spring clips/screw fasteners. [2 × 2] Not glue as it is permanent.	**4**	Maximum of 2 marks for each drawing: Method (name or annotations) – 1 mark Clear drawing – 1 mark Any other valid response
2(c)	Any **three** suitable ideas. Award up to **6 marks for communication of ideas** using the 'Communication of ideas' table. Award up to **6 marks for suitable designs** using the 'Suitable designs' table.	**12**	At least **three different** ideas for maximum marks. Pro rata if fewer.
2(d)	Award up to **6 marks for evaluation** of the ideas: Evaluation [2 × 3] e.g. Advantage + disadvantage explained for each idea Selection [1] Justification[1]	**8**	Simple repeats of same points for each idea not rewarded. Specific not generic justification. Award maximum marks if only either advantage or disadvantage given for each as long as the response includes sophisticated reasoning.

Question	Answer	Marks	Guidance
2(e)	Award up to **4 marks for quality of drawing** using the 'Quality of drawing' table. Award up to **2 marks for dimensions:** 2 or 3 overall dimensions only – **1 mark** Additional detail dimensions – **1 mark** Award up to **6 marks for construction detail** using the 'Construction details' table.	**12**	Additional detail dimensions might show thickness of materials, diameters, etc.
2(f)	Accept any **two** suitable **specific** materials. [1 × 2] Accept any **appropriate** reason for choice of **each** material [1 × 2]	**4**	Each suitable specific material – 1 mark Generic terms such as wood, metal, plastic **not** accepted. Appropriate reason for each material – 1 mark Materials must be appropriate for the design shown in **(e)**
2(g)	Accept any suitable manufacturing process. [1 × 1]	**1**	Process must be appropriate for design in **(e)**.
	Award up to **3 marks for description of process**.	**3**	Detailed description for 3 marks
	Award up to **2 marks for names of tools, equipment of machines used**.	**2**	Basic marking out tools, such as pencil or rule, or just drawings of tools/equipment = 1 mark only **Not** materials or resources such as PVA, glasspaper, screws...
OR			
3(a)	Accept any **four** additional specification points – simple to operate/rounded (safe) shape/adjustable for different cardboards/incorporate straightedge/will not damage cardboard/incorporate folding aid. [1 × 4]	**4**	Each specification point – 1 mark No repeats from question – produce a shallow indentation, used on cardboard, allow cardboard to be folded... Only accept unqualified or one-word answers if relevant to this specific design problem such as durable/resilient, ergonomic, functional... Do **not** generic answers such as waterproof, aesthetically pleasing... Any other valid response

Question	Answer	Marks	Guidance
3(b)	Accept drawings of any **two** methods of producing indentations for this purpose – wheel/blunt point/blunt knife edge or scissors/bevelled/thin/straight edge, mechanical press [2 × 2] Do **not** accept a sharp knife.	**4**	Maximum of 2 marks for each drawing: Method (name or annotations) – 1 mark Clear drawing – 1 mark Any other valid response
3(c)	Any **three** suitable ideas. Award up to **6 marks for communication of ideas** using the 'Communication of ideas' table. Award up to **6 marks for suitable designs** using the 'Suitable designs' table.	**12**	At least **three different** ideas for maximum marks. Pro rata if fewer.
3(d)	Award up to **6 marks for evaluation** of the ideas: Evaluation [2 × 3] e.g. Advantage + disadvantage explained for each idea Selection [1] Justification[1]	**8**	Simple repeats of same points for each idea not rewarded. Specific not generic justification. Award maximum marks if only either advantage or disadvantage given for each as long as the response includes sophisticated reasoning.
3(e)	Award up to **4 marks for quality of drawing** using the 'Quality of drawing' table. Award up to **2 marks for dimensions:** 2 or 3 overall dimensions only – **1 mark** Additional detail dimensions – **1 mark** Award up to **6 marks for construction detail** using the 'Construction details' table.	**12**	Additional detail dimensions might show thickness of materials, diameters, etc.
3(f)	Accept any **two** suitable **specific** materials. [1 × 2] Accept any **appropriate** reason for choice of **each** material [1 × 2]	**4**	Each suitable specific material – 1 mark Generic terms such as wood, metal, plastic **not** accepted. Appropriate reason for each material – 1 mark Materials must be appropriate for the design shown in **(e)**

Question	Answer	Marks	Guidance
3(g)	Accept any suitable manufacturing process. [1 × 1]	**1**	Process must be appropriate for design in **(e)**.
	Award up to **3 marks for description of process**.	**3**	Detailed description for 3 marks
	Award up to **2 marks for names of tools, equipment of machines used**.	**2**	Basic marking out tools, such as pencil or rule, or just drawings of tools/equipment = 1 mark only **Not** materials or resources such as PVA, glasspaper, screws...