CAMBRIDGE
International Education

Cambridge IGCSE™

DESIGN AND TECHNOLOGY **0445/12**

Paper 1 Product Design **May/June 2024**

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 May/June 2024 series for most Cambridge IGCSE, Cambridge International A and AS Level and Cambridge Pre-U 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 descriptions 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			**Suitability of 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. Suitable responses may include: must be stable, must have flat surfaces so the cakes don't slide off, reflective/mirror surfaces to enhance appearance of the cakes, made from hygienic materials, rotates so that cakes can be seen from all angles, must be strong enough to hold the weight of the cakes, made from recycled/recyclable materials etc. [1×4] Do **not** accept hold/display cakes or a specific number of cakes.	**4**	Each specification point – 1 mark No repeats from question – display cakes, attract people to buy, for cakes 60 diameter x 80 high, used in a shop/window, have three different height surfaces or be easy to dismantle. Only accept unqualified or one-word answers if relevant to this specific design problem – hygienic, stable, cleanable, easy to move, portable, aesthetic, lightweight, rustproof, water resistant, protect cakes from insects... Do **not** accept one-word generic answers such as safe, nice, durable, weatherproof, cost effective, user friendly... Any other valid response
1(b)	Accept drawings of any **two** methods of temporarily joining parts of a display stand such as: slots together, fastens together with parts that are threaded, bolts, woodscrews, dowels, hooks, Velcro, knock down fittings, magnets, push fittings with spring loaded ball bearing etc. [2×2]	**4**	Maximum of 2 marks for each drawing: Notes/labels/arrows showing method – 1 mark Clear drawing – 1 mark Accept slot together woodwork joints if they physically hold together and are **not** glued. 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 Suitability of designs' table.	**12**	At least **three different** ideas for maximum marks. Pro rata if fewer.

Question	Answer	Marks	Guidance
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 – **not** single words, or generic terms such as the best, meets the specification or most suitable [1]	**8**	Simple descriptions or 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 includes sophisticated reasoning.
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] Additional detail dimensions [1] 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 method [1]	**1**	Process must be appropriate for design in **(e)**.
	Award up to **3 marks for description of method**.	**3**	Detailed description for 3 marks
	Award up to **2 marks for names of tools, equipment or machines used**.	**2**	Basic marking out tools, such as pencil or rule, or just drawings of tools/equipment = 1 mark only

Question	Answer	Marks	Guidance
OR			
2(a)	Accept any **four** additional specification points – must hold items so that they do not slide about in the package and get damaged, made from card so it can be recycled after use, have a window so contents can be seen, contain information about the food, have a handle for carrying, etc. [1×4] Accept interpretations that see the package as 'a single use item' and those that see it as an item that can be 'reused'. If a reusable item accept washable, easy to clean...	**4**	Each specification point – 1 mark No repeats from question – for a packed lunch, for three items (including sizes of), made from thin sheet material, keeps food separate or assembled without adhesive Only accept unqualified or one-word answers if relevant to this specific design problem – recyclable, informative, reusable, visually appealing, keeps food fresh, non-toxic, lightweight, hygienic... Do **not** accept one-word generic answers such as safe, strong, nice, easy/simple to use, durable,.. Any other valid response
2(b)	Accept drawings of any **two** methods of joining thin sheet material without the use of an adhesive – Velcro, slot fixings, fold and tuck tabs, plastic clips, magnetic strips, screws, nuts and bolts, rivets etc. [2×2]	**4**	Maximum of 2 marks for each drawing: Notes/labels/arrows showing method – 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 'Suitability of designs' table. Do **not** award the top mark (6) for 'resistant materials' solutions as not strictly a package.	**12**	At least **three different** ideas for maximum marks. Pro rata if fewer.

Question	Answer	Marks	Guidance
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 - **not** single words, or generic terms such as the best, meets the specification or most suitable [1]	**8**	Simple descriptions or 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 includes sophisticated reasoning.
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] Additional detail dimensions [1] 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 method [1]	**1**	Process must be appropriate for design in **(e)**.
	Award up to **3 marks for description of method**.	**3**	Detailed description for 3 marks
	Award up to **2 marks for names of tools, equipment or machines used**.	**2**	Basic marking out tools, such as pencil or rule, or just drawings of tools/equipment = 1 mark only

Question	Answer	Marks	Guidance
OR			
3(a)	Accept any **four** additional specification points. Suitable responses may include: must be able to be dismantled so it can be cleaned, must be able to sharpen the blade, ergonomically designed for holding in one hand, fingers protected from the blade so that it is safe to use, made from hygienic materials such as chrome, strong enough to withstand the force of cutting the cake, etc. [1×4]	**4**	Each specification point – 1 mark No repeats from question – to slice cake, used in a café, handheld, adjustable, display thickness of slice being cut or the thickness in mm of the slice being cut. Only accept unqualified or one-word answers if relevant to this specific design problem – hygienic, cleanable, can be dismantled, rustproof, easy to store, durable, safe to use, lightweight... Do **not** accept one-word generic answers such as safe, strong, nice, adjustable, aesthetic, handheld... Any other valid response
3(b)	Accept drawings of any **two** methods of displaying numbers such as: LEDs, 7 segment display, rotating number (dials), slider, etc. [2×2]	**4**	Maximum of 2 marks for each drawing: Notes/labels/arrows showing method – 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 'Suitability of designs' table.	**12**	At least **three different** ideas for maximum marks. Pro rata if fewer.

Question	Answer	Marks	Guidance
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 - **not** single words, or generic terms such as the best, meets the specification or most suitable [1]	**8**	Simple descriptions or 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 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] Additional detail dimensions [1] 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)**
3(g)	Accept any suitable manufacturing method. [1×1]	**1**	Process must be appropriate for design in **(e)**.
	Award up to **3 marks for description of method**.	**3**	Detailed description for 3 marks
	Award up to **2 marks for names of tools, equipment or machines used**.	**2**	Basic marking out tools, such as pencil or rule, or just drawings of tools/equipment = 1 mark only