CAMBRIDGE
International Education

Cambridge IGCSE™

DESIGN & TECHNOLOGY **0445/13**

Paper 1 Product Design **October/November 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 October/November 2024 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 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			**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 – waterproof and weatherproof, able to be fixed to a vertical surface, suitable size for the target bird, access point for cleaning at the end of the nesting season, adjustable hole to attract a range of bird species, non-toxic finish to prevent hurting the birds... [1 × 4] Acceptable one word and short answers: easy to clean, easy to access, detachable lid, durable, robust, made from recycled/sustainable/recyclable materials, match the environment, easily mounted, stable, stable surface, balanced, protect birds, protect the nest well, ventilation... Any other valid response	**4**	Each specification point – 1 mark No repeats from question: attract birds, use in a garden, used to nest safely, suitable for different sized birds, flat-packed and assembled without the use of tools. Only accept unqualified answers (even if only word) if relevant to this specific design problem, **not** generic answers such as safe, lightweight, strong, nice, easily assembled, fast to assemble, aesthetic... unless qualified.

Question	Answer	Marks	Guidance
1(b)	Accept drawings of any **two** methods of joining sheet material without using adhesives or tools – wedges, fixing pegs, slot fixings, finger joints, nuts and bolts, wing nuts, Velcro, KD push fittings, magnets, split pin, paper fastener/clip... [2 × 2] Award marks for the method, the material does **not** need to be named. If the material is incorrectly named, do **not** awarded the second mark. Two applications of the same method, for example wing nuts used on wood and plastic, award a maximum of three marks. Any other valid response	**4**	Maximum of 2 marks for each response: Appropriate method sketched – 1 mark Appropriate notes – 1 mark
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 – **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.

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] Award up to **3 marks for description of process**. Award up to **2 marks for names of tools, equipment or machines used**.	**5**	Process must be appropriate for design in **(e)** and **not** just a stage in the making of a part of the solution.. Detailed description for 3 marks 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 – appealing design, eye catching colours, embossed features, fits through a standard letterbox, type of font style, top third of the card stands out (related to the display in the shop), relationship between the outside and inside of the card design… [1×4] Acceptable one word and short answers: informative about birds, colourful, easy to reproduce, low production cost, made from recycled/sustainable/recyclable materials, fit in an envelope, appeal to children/age group, specific occasion (birthday, exam success...), easy assemble, attractive... Any other valid response	**4**	Each specification point – 1 mark No repeats from question: used by a bird conservation group, sold in shops, based on the theme of birds, to generate interest (in birds) and incorporate movement. Only accept unqualified answers (even if only word) if relevant to this specific design problem, **not** generic answers such as safe, lightweight, strong, nice, informative, aesthetics, easy to carry, durable, long lasting... unless qualified
2(b)	Accept drawings of any **two** methods of producing movement – pop-up mechanism (V folds, floating layer, box), sliding and rotating elements, cams, spring or lever... [2 × 2] Award one mark for a concertina type folding paper spring. Any other valid response	**4**	Maximum of 2 marks for each response: Appropriate method sketched – 1 mark Appropriate notes – 1 mark
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.

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 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] Award up to **3 marks for description of process**. Award up to **2 marks for names of tools, equipment or machines used**.	**5**	Process must be appropriate for design in **(e)** and **not** just a stage in the making of a part of the solution. Detailed description for 3 marks 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 – must be able to be taken apart for cleaning, must not react with the food, easy to operate the release mechanism, holds the bag during use, easy to mount/position in the shop, can operate with a variety of bird food (size of grain etc.), food can be seen in the hopper… [1×4] Acceptable one word and short answers: cleanable, stable, informative (weight, type of food, cost...), easy to use, easy to refill, won't jam, see the type of seed, large capacity, low production cost, reliable, easy to operate, seals paper bag... Any other valid response	**4**	Each specification point – 1 mark No repeats from question: automatic device, fills paper bags with bird seed, used by customers, releases a measured amount of bird feed and releases food into a paper bag. Only accept unqualified answers (even if only word) if relevant to this specific design problem, **not** generic answers such as safe, lightweight, strong, nice, waterproof... unless qualified.
3(b)	Accept drawings of any **two** methods that control the measured amount of seed – rotating disk with a hole, drum with a pre-set volume that rotates, reciprocating hopper that fills up with food when under the hopper and releases it below when pulled out, trapdoor that opens for a pre-determined period of time…[2 × 2] Scoop, press button, pull lever... should be awarded a maximum of one mark. Any other valid response	**4**	Maximum of 2 marks for each response: Appropriate method sketched – 1 mark Appropriate notes – 1 mark
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.

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 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)**
3(g)	Accept any suitable manufacturing process. [1 × 1] Award up to **3 marks for description of process**. Award up to **2 marks for names of tools, equipment or machines used**.	**5**	Process must be appropriate for design in **(e)** and **not** just a stage in the making of a part of the solution. Detailed description for 3 marks Basic marking out tools, such as pencil or rule, or just drawings of tools/equipment = 1 mark only