CAMBRIDGE
International Education

Cambridge IGCSE™

DESIGN AND TECHNOLOGY **0445/32**

Paper 3 Resistant Materials **May/June 2025**

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 2025 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.

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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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Annotations guidance for centres

Examiners use a system of annotations as a shorthand for communicating their marking decisions to one another. Examiners are trained during the standardisation process on how and when to use annotations. The purpose of annotations is to inform the standard isation and monitoring processes and guide the supervising examiners when they are checking the work of examiners within their team. The meaning of annotations and how they are used is specific to each component and is understood by all examiners who mark the component.

We publish annotations in our mark schemes to help centres understand the annotations they may see on copies of scripts. Note that there may not be a direct correlation between the number of annotations on a script and the mark awarded. Similarly, the use of an annotation may not be an indication of the quality of the response.

The annotations listed below were available to examiners marking this component in this series.

Annotations

Annotation	Meaning
	Unclear
	Benefit of the doubt
	Incorrect point
	Error carried forward
N/A	Highlighting areas of text
	No benefit of doubt given
N/A	Off-page comment – allows comments to be entered off the page
	Repeat
	Indicates that the point has been noted, but no credit has been given
	Indicates that the point has been noted, but no credit has been given (big)

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Annotation	Meaning
	Correct point
TV	Too vague
DET	Relevant detail

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Question	Answer	Marks	Guidance
1	**A** tinsnips **B** cold chisel **C** guillotine, bench shears [3 × 1]	**3**	**A** Accept snips, straight/curved snips, tin snippers, metal shears

Question	Answer	Marks	Guidance
2	Tongue shown [1] Groove shown [1] Technical accuracy/proportion [1]	**3**	Accept freehand or ruler-drawn joint. Accept exploded or closed joint. Look at length and thickness of 'tongue'

Question	Answer	Marks	Guidance
3(a)	Centre lathe, lathe, metal lathe, engineers lathe,	**1**	Do not accept CNC
3(b)	Knurling	**1**	

Question	Answer	Marks	Guidance
4(a)	**B** end grain opposite to **A** [1] **C** end grain same as **A** [1]	**2**	Award 1 mark for end grain drawn as on **A**
4(b)	Reason: wide board not available, greater stability, less warping	**1**	Do not accept 'stops breaking', 'snapping', more durable, cheaper Do not accept references to 'length' of boards

Question	Answer	Marks	Guidance
5(a)	HDPE, PP, ABS	**1**	

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Question	Answer	Marks	Guidance
5(b)	Advantages: lightweight, non-corrosive	**1**	Accept any valid advantages in use
6	Methods include: scrap wood clamped at end of board, plane to centre from both ends [0 – 2]	**2**	Award 0–2 dependent on technical accuracy

Question	Answer	Marks	Guidance
7	Beaten or hammered [1] Continuously or repeatedly [1]	**2**	Do not accept references to ‘heating’ metal

Question	Answer	Marks	Guidance
8	Stopped housing shown in lower board [1] Stopped housing shown in upper board [1] Technical accuracy [1]	**3**	Do not accept through or double-stopped housings

Question	Answer	Marks	Guidance
9	Heat	**1**	

Question	Answer	Marks	Guidance
10(a)	Reasons: bright colours, more intricate shapes, lighter to handle, smoother, no splinters [2 × 1]	**2**	Accept any valid reasons e.g.: child preferences Do not accept ‘more attractive’

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Question	Answer	Marks	Guidance
10(b)	Reasons include: Wood used can be replaced with replanted trees. Wood used to make products can be reprocessed to produce manufactured boards Oil used to produce plastic is a finite source.	**1**	
10(c)	Injection moulding, 3D printing	**1**	

Question	Answer	Marks	Guidance
11(a)	Properties include: attractive, variety of colours, self-finishing, easily shaped, easy to work, easy to clean, lightweight to carry, water resistant, durable [2 × 1]	**2**	Accept any valid properties
11(b)	2 items: size of markers and board rubber, number of markers, location, ease of access	**2**	Accept any valid items of research
11(c)(i)	Card modelling: quick, accessible, cheap, no waste of expensive materials	**1**	Accept any valid benefits
11(c)(ii)	Computer program: ease of editing, transfer to CNC machine, send images electronically, create 3D model, accuracy	**1**	Accept any valid benefits
11(d)(i)	Chinagraph pencil, felt tip marker pen, scriber, odd leg calipers [2 × 1]	**2**	
11(d)(ii)	Hole/s drilled in acrylic [1] Saw blade inserted [1] Waste sawn out [1] Correctly named saw [1] Cut edges filed [1]	**5**	Accepted saws: coping, Hegner/scroll, abra, piercing

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Question	Answer	Marks	Guidance
11(e)	Template with holes drilled + 1 side + 1 edge located [3] Suitable material for jig named [1] Additional explanatory notes [1]	**5**	Template with holes drilled = 1 Template with holes drilled + 1 side = 2
11(f)	Sacrificial board underneath [1] Some type of clamp [1] Added notes to describe method [1]	**3**	Accept references to pilot holes, drill speed, use of hole saw
11(g)	Heat acrylic [1] Method of heating acrylic named: strip heater, line bender, heat gun [1] Use of some type of former or line bender [1] Bend to shape and retain while cooling [1]	**4**	Do not accept oven to heat the acrylic

Question	Answer	Marks	Guidance
12(a)(i)	Wide variety of hardwoods available: e.g. birch, beech, ramin	**1**	
12(a)(ii)	ABS, acrylic, HDPE,polypropylene, PLA	**1**	Do not accept PVC
12(a)(iii)	Mild steel, stainless steel, steel	**1**	Do not accept iron
12(b)	**Practical idea** **[**0 – 2] Award max.2 for some sort of ‘clip’ Award max.1 for use of magnet, Velcro **Constructional details** **[**0 – 2]	**4**	Award max 2 marks for some sort of ‘clip’ Award max 1 mark for use of magnet, velcro Award max 1 mark for use of contact or epoxy resin adhesive with magnet, velcro
12(c)(i)	Scriber, felt tip marker pen	**1**	
12(c)(ii)	Dividers	**1**	

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Question	Answer	Marks	Guidance
12(c)(iii)	Centre/dot punch	**1**	
12(d)(i)	Emery cloth, wet and dry [silicon carbide] paper, steel/wire wool [2 × 1]	**2**	
12(d)(ii)	Polyethylene, polythene, PET	**1**	Accept trade names: e.g. 'Plastisol'
12(d)(iii)	2 finishes include: lacquer, paint, galvanise, electroplating, chrome plating [2 × 1]	**2**	Do not accept polish, varnish
12(e)	Dowel fitted into chuck of lathe [1] Centre drill fitted into tailstock chuck and drill provides 'start' [1] Ø3 mm twist drill fitted into tailstock chuck to drill reqd. hole [1] **OR** Use of pedestal/bench drilling machines to drill vertically [1] Dowel secured in machine vice [or similar] [1] **OR** Centre punch end of dowel to guide drill [1]	**3**	
12(f)	Square base shown fits **inside** container [1] Suitable material for base named [1] Base glued into tube [1]	**3**	If base is **not** fitted inside award 0 marks
12(g)(i)	Ferrous metals are produced from a non-renewable, finite source Production of metals uses a lot of energy	**2**	Reward 1 point expanded or several points made
12(g)(ii)	Plastics are produced by processing oil, gas or coal which are non-renewable, finite sources Many plastics cannot be recycled	**2**	Reward 1 point expanded or several points made

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Question	Answer	Marks	Guidance
13(a)(i)	Wide variety of hardwoods available: for example, oak, beech, mahogany, birch, walnut	**1**	Check unfamiliar named woods which may be indigenous to centre's country
13(a)(ii)	Reasons: hardwood more attractive, more durable, can be easier to work, tougher [2 × 1]	**2**	Do not accept 'more stable', 'better quality'
13(a)(iii)	Plywood, blockboard, chipboard, MDF, laminboard	**1**	
13(a)(iv)	Veneer	**1**	
13(a)(v)	To give the appearance of solid wood, more attractive, cheaper than making desktop from oak	**1**	Do not accept 'gives protection'
13(b)(i)	Marking gauge	**1**	
13(b)(ii)	2 only	**1**	
13(b)(iii)	Ø6 mm minimum--- Ø12 mm maximum	**1**	Accept any number between min. and max.
13(c)(i)	2 cramps shown: 1 at top of frame, 1 at bottom of frame* [2 × 1] Cramps shown in centre of rails [1] Use of scrap wood [1]	**4**	Award 2 cramps shown: 1 at top of frame, 1 at bottom of frame even if cramps shown are not the correct type of cramp
13(c)(ii)	Sash, F cramp, quick grip, quick release cramps	**1**	
13(c)(iii)	2 checks: wipe off surplus glue, check for tightness of cramps, check for square, check for winding / frame lies flat [2 × 1]	**2**	

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Question	Answer	Marks	Guidance
13(d)	Use of groove on inside of support [1] Use of bead [to fit in groove] fitted to outside of drawer [1] **OR** Use of groove on outside of drawer [1] Use of bead [to fit in groove] fitted to inside of support [1] Materials [1] Constructions [1]	**4**	Accept use of rebates
13(e)	3 divisions [1] Material for partitions named [1] Sizes of partitions to fit inside drawer [0 – 2] Constructions [1]	**5**	Sizes of partitions - any 2 Length of partition front to back max.400–415 Height of partition max. 90 Maximum length of partition along the inside length of drawer 770

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