

Cambridge IGCSE™

DESIGN & TECHNOLOGY**0445/32**

Paper 3 Resistant Materials

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.

This document consists of **9** printed pages.

PUBLISHED**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.

Question	Answer	Marks	Guidance
1	Any 2 benefits such as: lightweight, tough, corrosion resistance, durable, weather / water resistant, low density, good strength-weight ratio, impact / shock resistant, shaped easily, stronger, lasts longer, does not conduct electricity [2 × 1]	2	Accept any valid benefits Not strong, malleable

Question	Answer	Marks	Guidance
2(a)	Copper	1	
2(b)	(soft) soldering	1	Not hard soldering

Question	Answer	Marks	Guidance
3	Some sort of wedge inserted into tenon, dowel, screw/s, nail/s inserted or through edge of upright	3	Max 1 glue only, if gluing is only method stated Max 2 if nail, pin, screw, dowel etc. is not long enough to go through edge and tenon Max 2 if nail, pin, screw, dowel etc. is not flush against upright Max 3 if nail, pin, screw, dowel etc. is shown vertically through tenon or horizontally through edge Max 3 for use of wooden blocks / KD fittings, brackets in either the front of or behind the vertical piece

Question	Answer	Marks	Guidance
4	Wheelbarrow body: zinc, galvanised, painted [1] Silver pendant: self-finished, polished, buffing [1] Brass tap: chrome plated, electroplated [1]	3	

Question	Answer	Marks	Guidance
5	Plastic heated [1] Use of former or bending jig [1] Shape retained while cooling [1]	3	

Question	Answer	Marks	Guidance
6	Any 3 stages such as: insert wood into steam chest and seal, steam is produced, steam is fed into chest where wood absorbs the hot moisture, wood becomes pliable [3 × 1]	3	Accept any valid stages with reference to any of the labelled parts in Fig. 6.1

Question	Answer	Marks	Guidance
7	Steel tube shown in vice at 45° [1] Correct height to make saw cut [1]	2	

Question	Answer	Marks	Guidance
8	Glass fibre mat [1] (Polyester) resin used [1]	2	

Question	Answer	Marks	Guidance
9(a)	Low density polythene / polyethylene	1	Must include 'Low Density'
9(b)	Any 2 ways such as: replace with paper bags, 'bag for life', encourage customers to provide their own, charging customers for bags as a deterrent, recycle used bags in store [2 × 1]	2	Accept any valid ways

Question	Answer	Marks	Guidance
10	B the manufacturing processes required could be carried out more quickly than stool A which requires fabrication, less materials used More manufacturing time increases the cost of the stool [0 – 2]	2	

Question	Answer	Marks	Guidance
11(a)	Any 2 benefits such as: hardwearing, attractive appearance / grain markings, polishes well, durable, hard, tough [2 × 1]	2	Accept any other valid benefits Not strong
11(b)(i)	Any 2 tools: pencil, marking knife, steel rule, try square [2 × 1]	2	Accept ruler, metre rule, measuring tape
11(b)(ii)	Tenon saw, dovetail saw, backsaw	1	
11(c)	'Template' [with 2 holes drilled] [1] 'Template' + one side or one edge located [2] 'Template' + one side and one end located [3] Notes to describe features of jig [1]	4	Award 1 max for use of panel pins to mark centres
11(d)	Method one: use of try square [1] shown in corner of frame [1] Method two: long rule / straight edge [1] shown measuring diagonal distance [1]	4	Accept use of set square for try square Diagonal measurement must be inside frame
11(e)(i)	Right hand leaf accurately drawn [1] Butt hinge has min. 2– max. 3 holes in leaf [1] Knuckle / pin recognised [1]	3	Accept 3 holes staggered
11(e)(ii)	Flush hinge, piano hinge, back flap hinge	1	
11(f)	Practical idea: some form of 'stop' applied to back of platform or recesses cut in back of platform [1] 3 different angles [1] Additional materials named + constructional details [0 – 2]	4	
11(g)(i)	Ergonomics: 3 different angles [1] for different users to view tablet comfortably [1]	2	Accept: easy to transport, people of different heights

Question	Answer	Marks	Guidance
11(g)(ii)	Sustainability: hardwood trees that are cut down to provide the wood [1] can be replaced with 'new' trees, durability of materials means products last longer / less need to replace [1]	2	

Question	Answer	Marks	Guidance
12(a)(i)	To provide a guide for the tip of the drill, to prevent the drill from slipping	1	Accept any valid reasons. Not accurate
12(a)(ii)	To make it easier for the Ø15 drill to produce a hole, provide a guide for the Ø15 drill	1	
12(a)(iii)	Hacksaw, junior hacksaw, Hegner saw, band saw, piercing saw	1	Hegner and band saws must have metal cutting blades stated for marks
12(a)(iv)	Tin snips, Hegner saw, band saw, piercing saw	1	Hegner and band saws must have metal cutting blades stated for marks
12(a)(v)	Half round, round or rat tail	1	Not rounded
12(b)	Sketches showing use of a former, held in a vice, mallet or hammer [3 × 1] Quality / clarity of communication [1]	4	Do not reward heating of metal sheet
12(c)(i)	Any 3 modifications such as: enlarge view, erase / delete, fill colour, add texture, 3D view [3 × 1]	3	Accept any other valid modifications
12(c)(ii)	Any 2 benefits such as: repetitive accuracy, speed, consistency of product, machines can run constantly on repetitive tasks	2	Accept any other valid benefits
12(d)	'Bracket' attached to back of coat rack [0 – 2] Allowance in bracket to fit over or on the 2 screws [0 – 2] Named materials and constructions [0 – 2]	6	Metal to metal bracket: soldering / brazing Metal to wooden bracket: epoxy resin
12(e)(i)	Dip coated / plastic / powder coated finish, electroplated chrome, zinc, galvanising, oil blue finish	1	

Question	Answer	Marks	Guidance
12(e)(ii)	Clean the metal [1] Method of cleaning metal: degrease, use different grades of emery cloth, wet and dry (silicon carbide) paper, steel / wire wool [1]	2	Accept use of alcohol to degrease
12(f)	Any 2 advantages such as: can be self-finished, anodised, does not corrode, easier to bend, easier to work [2 × 1]	2	Accept any other valid advantages Not lightweight

Question	Answer	Marks	Guidance
13(a)(i)	Wide variety of suitable hardwoods available	1	Internet search for obscure named hardwoods
13(a)(ii)	Plywood, hardboard, MDF	1	
13(b)	Half lap cut out of one piece [1] End completed on second piece [1]	2	Do accept assembled half lap joints
13(c)(i)	Base on which 'strips' will be attached [1] Shaped strips [1] Accurate sizes / proportions [1] Quality of communication / technical accuracy [1]	4	
13(c)(ii)	MDF	1	
13(d)(i)	Use of coping, Hegner, scroll, band saws to cut out shape [1] Use of files, wet and dry [silicon carbide] paper to make edges smooth [1] Drill 'pilot' hole and insert blade of saw to cut out hole, use of hole saw [1] Accuracy of named tools and equipment [1]	4	Stage 1 reward use of laser cutter: named only for 1 mark max. Details required to access max. 4 marks Stage 2 reward only one from the list Stage 3 do not reward router to cut hole Award 1 mark if most tools and equipment are named correctly
13(d)(ii)	Clamp acrylic sheet securely to drill table or any flat surface [1] Sacrificial board positioned under acrylic sheet [1]	2	

Question	Answer	Marks	Guidance
13(d)(iii)	Practical idea: use of 'clips', 'turn buttons' to secure palette [0–2] Materials / fittings named [1]	3	Accept use of Velcro, magnets, rubber bands, fabric pockets
13(e)	Practical design of handle [0 – 2] Attached to case [1] Named material appropriate [1]	4	Award 1 mark only if handle is attached to lid, not side of case
13(f)	Part A shown in correct position on lid [1] Part B shown in correct position on base [1] Overall accuracy / alignment [1]	3	Award 1 mark for accuracy / alignment even if parts A and B are upside down on the case