



Cambridge IGCSE™

DESIGN AND TECHNOLOGY

0445/31

Paper 3 Resistant Materials

May/June 2020

MARK SCHEME

Maximum Mark: 50

Published

Students did not sit exam papers in the June 2020 series due to the Covid-19 global pandemic.

This mark scheme is published to support teachers and students and should be read together with the question paper. It shows the requirements of the exam. The answer column of the mark scheme shows the proposed basis on which Examiners would award marks for this exam. Where appropriate, this column also provides the most likely acceptable alternative responses expected from students. Examiners usually review the mark scheme after they have seen student responses and update the mark scheme if appropriate. In the June series, Examiners were unable to consider the acceptability of alternative responses, as there were no student responses to consider.

Mark schemes should usually be read together with the Principal Examiner Report for Teachers. However, because students did not sit exam papers, there is no Principal Examiner Report for Teachers for the June 2020 series.

Cambridge International will not enter into discussions about these mark schemes.

Cambridge International is publishing the mark schemes for the June 2020 series for most Cambridge IGCSE™ and Cambridge International A & AS Level components, and some Cambridge O Level components.

This document consists of **6** printed pages.

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.

Question	Answer	Marks
1	Accept any 2 from length, type of head, material, gauge, number reqd. 2 × 1	2

Question	Answer	Marks
2(a)	Alloy: brass or stainless steel 1	1
2(b)	Composite: carbon fibre 1	1

Question	Answer	Marks
3	Joint recognised 1 Accuracy of two halvings 2 × 1	3

Question	Answer	Marks
4	Plastic chair: polypropylene, ABS 1 Metal pipe fittings: copper, brass, stainless steel, aluminium 1 Model glider kit: balsa 1	3

Question	Answer	Marks
5	Template: used to mark out the shape quickly/accurately 1 Former: used to enable the acrylic to be bent to shape 1 Drilling jig: used to drill fixing holes quickly and accurately 1	3

Question	Answer	Marks
6	Chuck 1 Knurling tool 1	2

Question	Answer	Marks
7(a)	Scriber, steel rule, try square 1	1
7(b)	Hacksaw 1	1
7(c)	File [specific name not required] 1	1

Question	Answer	Marks
8	Explanation Advantages include: consistent quality of products, less skilled labour reqd. faster production, easy to change to different products, continuous operation	2

Question	Answer	Marks
9	Appropriate method Accuracy of drawing: proportion/orientation	1 0–2 3

Question	Answer	Marks
10	Points include: Lid to retain heat, prevent spillages. Ridged 'collar' for grip, prevent burns. Tapered shape for stability and safety.	2

Question	Answer	Marks
11(a)	Drill small hole Cut out waste with piercing saw File to shape Correctly named tools and equipment	1 1 1 1 4
11(b)(i)	On end of leg: Die Inside hole: Tap	1 1 2
11(b)(ii)	Soldering	1
11(c)(i)	Use of a chisel [and mallet] to remove waste Work piece held securely [clamped] Technical accuracy	1 1 1 3
11(c)(ii)	Benefit: close grain is unlikely to split easily. Provides a tough material.	1
11(d)	Modification: some sort of 'handle' recognised Practical method Appropriate materials Suitable constructions	1 1 1 1 4
11(e)(i)	Acrylic suitable: colourful, self-finishing, easy to work to reqd. design	2 × 1 2
11(e)(ii)	Extrusion/extrusion blow moulding	1
11(f)(i)	Tenon saw, hacksaw, Hegner saw, band saw	1
11(f)(ii)	Hold tube securely Does not require measuring of tube to length 5 different lengths can be sawn Ease of 'changing' different lengths	1 1 1 1 4
11(g)	Two ways include: wear a face mask, well-ventilated room, extraction unit	2 × 1 2

Question	Answer	Marks
12(a)	Short side width: 80 mm Base length: 330–360 mm Long partition length: 330 mm * Short partition: 150 mm *	1 1 1 1 4
12(b)	Dovetail, finger [comb], dowel, lapped, half-lapped, mitre named Suitable joint recognised Correct orientation [as per Fig. 12.1] Good proportion/accuracy	1 1 1 1 4
12(c)(i)	Tenon, dovetail, coping, Hegner, scroll, band saws	2 × 1 2
12(c)(ii)	Stable, will not warp or twist, less likely to split, strong in all directions	2 × 1 2
12(d)	Different method: use of vacuum formed plastic tray inserted Sketch showing separate partitions Added notes to explain process	1 1 1 3
12(e)(i)	Lid can fit inside, on top of or over the sides of the box	5
12(e)(ii)	Modification: some sort of 'handle': practical method Appropriate materials Suitable constructions	1 1 1 3
12(f)	Moulded shape : less constructions, rounded shape, inherent colours-no need for an applied finish	2 × 1 2

Question	Answer	Marks
13(a)	Two advantages: non-ferrous metals can be self-finished, attractive, resist corrosion	2 × 1 2
13(b)(i)	Hold tube securely Does not require measuring of tube to length 5 different lengths can be sawn Ease of 'changing' different lengths	1 1 1 1 4
13(b)(ii)	Tube held securely in [3 jaw] chuck Lathe tool set up correctly Lathe tool taken across the end of the tube and faced off	1 1 1 3
13(c)(i)	Wet and dry [silicon carbide] paper,	1 1
13(c)(ii)	Polishing wheel, buffing machine	1 1
13(c)(iii)	Lacquer applied by brush or spray and suspended to dry to prevent marks	1 1
13(d)(i)	Faceplate, between centres	2 × 1 2
13(d)(ii)	Saw off the corners of the block Use of disc sander, files, glasspaper to finish to shape Correctly named tools and equipment	1 1 1 3

Question	Answer	Marks
13(e)	Quality control checks include: dimension checks of various component parts of the wind chimes, e.g. length of tube, positions of holes, diameter of top piece. Visual check on quality of finish. 2×2	4
13(f)	Practical idea: allows bracket to be fixed to a wall chimes secure materials constructions	4 1 1 1 1