

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

**MARK SCHEME for the October/November 2011 question paper
for the guidance of teachers**

0445 DESIGN AND TECHNOLOGY

0445/31

Paper 3 (Resistant Materials), maximum raw mark 50

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.

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1	(a) mitre square					[1]
	(b) for marking out, for testing, marking 45° angles/bevels					[1]
2	(a) planishing					[1]
	(b) 2 reasons include: decoration, make metal harder to retain shape, remove irregularities in the shape, make it attractive				2x1	[2]
3	left to right: angle/angle iron	round tube	square bar/rod		3x1	[3]
4	left to right: facing off	parallel turning	parting off		3x1	[3]
5	barrel in correct position				1	
	screw thread in correct position				1	
	technical accuracy				1	[3]
6	completed frame				1	
	completed blade and/or pins				1	[2]
7	modification includes use of 'dips' for thumbs sloping inside edges = 1 mark				0–2	[2]
8	cross filing					[1]
9	technical accuracy of both parts of the joint/both halves equal size				0–3	[3]
10	A headstock	B tee rest/rest	C tailstock/dead centre		3x1	[3]
		tool rest				

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Section B

11 (a)	suitable permanent joint: dowel, mortise and tenon. Not butt. one piece of dowel = 1 mark maximum accuracy/quality of sketch correct name	0–3	[3] [1]
(b) (i)	plywood, blockboard. Not MDF.		[1]
(ii)	slope to ensure rain drains/runs off		[1]
(iii)	screw through top into top rails or use of blocks or KD fittings screw into top of legs = 2 marks maximum dowels not glued = 1 mark maximum hinged = 2 marks maximum technical accuracy/quality of communication	0–3	[3]
(c) (i)	suitable hinge: butt, piano. Not back flap. accuracy/quality of sketch correct name	0–3	[3] [1]
(ii)	steel rusts		[1]
(d) (i)	marking gauge, try square, marking knife, measuring tape	2x1	[2]
(ii)	2 methods of chiselling: vertical paring then horizontal paring tools used: mallet and chisel	2x1 2x1	[4]
(e)	secured closed: use of turn button screwed to centre upright, magnetic catch prevented swinging inwards: use of a wooden stop [1] pinned and glued [1] accuracy of technical information/details	0–2 0–2 0–1	[5]
12 (a) (i)	mild steel. Not steel.		[1]
(ii)	cheaper, hard wearing, easy to work, durable		[1]
(iii)	1.5, 1.6, 2.0 mm thick		[1]
(iv)	5.0, 6.0 mm Ø		[1]
(b)	easier to drill flat, more accurate, safer	2x1	[2]

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(c) (i)	use of a tap and tap wrench technique: turn then $\frac{1}{4}$ reverse turn to remove swarf, use of cutting compound	0–2 0–2	[4]
(ii)	use of die and die stock/holder technique: chamfer end of rod, turn then $\frac{1}{4}$ reverse turn to remove swarf, use of cutting compound	0–2 0–2	[4]
(d)	damage prevented by pad inserted between end of rod and table pad/foot attached to end of rod	1 1	[2]
(e)	easier to tighten by means of a 'tommy' bar principle accuracy of technical information/details	1 0–2	[3]
(f)	stages involved: drill hole in top of bracket clean hole and ends of post with emery cloth apply flux position on brazing hearth/fire bricks apply heat using torch apply spelter at appropriate temperature	 1 1 1 1 1 1	[6]

13 (a)

Stage	Process	Tools and equipment
1	Mark out	Rule, try square, pencil, marking knife, compass
2	Drill a hole in each end	Drilling machine, drill, bit
3	Round the corners	Sanding disc, file, spokeshave
4	Saw off end pieces	Tenon saw/bench hook
5	Square the sawn ends	Jack plane, sanding disc, smoothing plane, shooting board
6	Glue ends to back of holder	PVA adhesive

Accept **one** tool for 1 mark [6]

- (b)** suitable joint: finger [comb], dovetail, half lap, mitre, dowel
accuracy/quality of sketch 0–3 [3]
correct name [1]
- (c)** for removal purposes [1]
- (d) (i)** soften plastic by means of strip heater/line bender/hot air gun 1
use of former/line bender setting to form bend 1
hold and retain while cooling 1
accuracy of technical detail 1 [4]
- (ii)** mark out disc on acrylic 1
cut out circular shape. Allow hole saw for 1st two stages 1
allow hole saw for 1st two stages = 2 marks
complete shape and finish edge 1
discs cemented: tools/equipment named 1 [4]
- (iii)** wear gloves, use barrier cream, mouth mask, good ventilation,
eye protection 2x1 [2]
- (e)** flexible property used so that the ends can be forced apart to
remove/replace the kitchen roll 0–2 [2]
- (f)** cost of setting up/tooling is high 1
large quantities of products need to be made to recover costs 1 [2]