

CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International General Certificate of Secondary Education

MARK SCHEME for the October/November 2014 series

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.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

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Section A

- 1 (a) aluminium, steel [1]
- (b) polypropylene [1]
- (c) paint, electroplating such as chrome, dip coated plastic, powder coating, anodised [1]
- (d) protect, make appearance more attractive [1]

2

Tool	Name	Specific use
	Rip, Cross-cut, Sheet, Hand, Panel saw	Cutting wood, plastic, metal
	Inside calipers	Measuring the internal diameter of tube

4 × 1 [4]

- 3 (a) benefit of cordless electric drill:
versatile use in wide variety of situations, portable [1]
- (b) benefit of bench drill: guaranteed vertical drilling, more robust, stable, secure, more drilling power [1]
- 4 (a) tenon saw, dovetail saw [1]
- (b) bench hook or cutting board [1]
- 5 A scribe 1
B centre square 1 [2]
- 6 casting / sand casting [1]

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Award 1 mark for 3 triangles marked out as above

Award 2 marks showing waste between

[2]

8 (a) bench stop

[1]

(b) planing wood

[1]

9 Main issue is that candidates understand the importance of grain direction

(a) Award 0–2 dependent on technical accuracy

[2]

(b) Award 0–2 dependent on technical accuracy

[2]

10 (a) acetate, polystyrene, polythene

[1]

(b) can be moulded to specific shape, very secure packaging, transparent, protects product

[1]

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Section B

- 11 (a)** Types of garment, methods of suspending garments, door measurements: height, width and thickness, number of coats, sizes / weights of coats, 2 × 1 [2]
- (b) (i)** scribe, rule, try square 2 × 1 [2]
- (ii)** to make the marking out stand out / become clearer [1]
- (c)** 3 stages:
- use of vice or clamped in position 1
 - use of former / folding bars 1
 - method of force: hammer and scrap wood or mallet 1 [3]
- (d) (i)** Accept any 2 from:
- to bend / shape the metal
 - metal being worked can become work hardened
 - need to soften the metal for further working 2 × 1 [2]
- (ii)** 3 stages:
- heat metal 1
 - to dull red [correct temperature] 1
 - leave to cool 1 [3]
- (e)** paint, electroplated, lacquer [1]
- (f)** Accept any 3 from:
- file / filing, use of emery cloth, wet and dry [silicon carbide paper], polishing mop and compound [3]
- (g) (i)** Appropriate 'bracket' or peg 0–1
- Appropriate material 0–1
 - Appropriate sizes 0–1 [3]
- (ii)** method of joining must correspond to named materials: appropriate use of brazing, silver / hard soldering, riveting. Award marks for relevant individual stages in the process 5 × 1 [5]

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- 12 (a)** 2 advantages include: cheaper than solid wood, no grain direction problems, more stable as it is less likely to shrink or expand, large sheet size available 2 × 1 [2]
- (b) (i)** jig saw, router [1]
- (ii)** safety precautions include: no trailing leads, wear eye protection, follow manufacturers' instructions, make sure work is secured, ear defenders, tie hair back 2 × 1 [2]
- (c) (i)** Saw down outside of slot [tenon saw] 1
 Remove waste [chisel, coping saw] 1
 Make slot level [chisel, file] 1
 Suitability / technical accuracy of tools and equipment named 1 [4]
 No reward for marking out details.
- (ii)** use of strips of wood pinned and glued or screwed and glued under slot 0–2
 details of materials, sizes and fittings used 0–2 [4]
- (d)** Use of rod, dowel only 0–1
 Pedal secure 0–1
 Adjustable and fixed to 3 positions 0–1
 Details of materials, sizes and fittings 0–2 [5]
- (e)** Award 1 mark for general understanding of anthropometrics i.e. human measurements
 Award 2 marks for specific reference to height of child, length of legs, width of back, arm reach 2 × 1 [2]
- (f) (i)** injection moulding, blow moulding [1]
- (ii)** use of rod / axle 0–1
 method of retaining rod / axle 0–1
 secured to toy 0–1
 details of materials, sizes and fittings 0–1 [4]

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- 13 (a)** 3 main parts:
 marking out using pencil, rule, compass
 cutting the shape using a tenon saw and G clamp or use of a vibro / Hegner saw
 making the edges flat and smooth using a plane, sanding disc, glasspaper
- Award 0–2 marks for each part dependent on accuracy of technical detail [6]
- (b)** use of 2 sash cramps 1
 cramps shown over edges of top and bottom 1
 use of scrap wood to distribute pressure 1 [3]
- (c)** use of metal rod [minimum Ø 25 mm], marbles or ball bearings fitted in a groove, ball race 0–2
 details of materials and fittings used 0–2 [4]
- (d)** methods include the use of strips, guides, recesses onto / into the bottom and / or the central column
- Practical solution 0–2
 Details of materials, constructions and fittings 0–3 [5]
- (e) (i)** white / French polish, Danish oil, wax [1]
- (ii)** Award 0–2 dependent on quality of answer to include as much of the following:
 surfaces would be glasspapered using a cork rubber / block
 various grades used getting finer through process
 wipe off dust and dampen surface after each grade [2]
- (f)** template could be used when marking out the shape of the top, bottom or base
- jig could be used when drilling holes in the top and bottom, or when sawing the top, bottom and base to shape 2 × 1 [2]
- (g)** hardwood needs to be seasoned properly so that it does not shrink or expand excessively
- understanding of seasoning evident 1
 consequences of not seasoned properly 1 [2]