

**MARK SCHEME for the October/November 2013 series**

**0445 DESIGN AND TECHNOLOGY**

**0445/32**

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.

Cambridge will not enter into discussions about these mark schemes.



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**Section A**

- 1 Lightweight, easy to cut/join/shape/work with/use. (2 × 1) [2]
- 2 (a) coping saw, scroll saw, fret saw, Hegner or equivalent [1]
- (b) piercing saw, abra file saw [1]
- 3 (a) spanner, wrench [1]
- (b) Allen key [1]
- 4 (a) aluminium [1]
- (b) will not rust/corrode [1]
- 5 Brittle, liable to breaking off corners and/or edges, difficult to construct traditional joints, difficult to finish. (2 × 1) [2]
- 6 Lightweight material, comfortable moulded shape, can be colourful, resistance to outdoors. (2 × 1) [2]
- 7 Accuracy of completed joint (0–3)  
Award max. 2 marks if assembled [3]
- 8 One wide board not practical, grain inverted for stability, boards/tree not wide enough, makes table top stronger. (2 × 1) [2]

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| Tool  | Name          | Specific use  |
|---|---------------|---|
|  | Pincers       | Pulling out pins or nails   |
|  | Mortise gauge | Marking a pair of parallel lines, marking out a mortise and tenon joint |

[4]

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|           |  |   |            |
|-----------|--|---|------------|
| <b>10</b> | Washing-up liquid bottle<br>Boat hull<br>Disposable cups<br>Comb | polythene<br>polyester resin, GRP<br>polypropylene, polystyrene, Styrofoam, polythene<br>polypropylene, nylon, ABS, acrylic | <b>[4]</b> |
|-----------|--|---|------------|

### Section B

- 11 (a)** Marked out using a combination of: pencil, marking knife, rule, mortise and cutting gauges, try square.  
Award 0–3 dependent upon technical accuracy/quality of communication.
- Cut out and fitted using combination of: tenon saw, coping saw, chisel and mallet, files.  
Award 0–3 dependent upon technical accuracy/quality of communication. **[6]**
- (b)** 4 cramps shown in correct position. 2 cramps in one direction and 2 at 90°. (0–2)  
2 cramps only (1)  
Corner cramps: top & bottom each corner (2)  
Corner cramps: top or bottom only (1)  
Use of scrap wood to prevent bruising and even pressure (1)
- Sash cramps / corner cramps named (1)
- Suitable adhesive. Accept wide range of generic or trade names (1) **[5]**
- (c) (i)** Drill small hole, insert blade from coping saw, Hegner saw or equivalent, cut out shape roughly, file up to mark. (4 × 1 stages)  
Accept hole saw: hole saw drawn/named, fit in drill, clamped work piece, smooth off using file/wet and dry. (4 × 1 stages) **[4]**
- (ii)** Accept any sensible precaution that must be linked to a process, e.g.  
Sawing: keep low in vice, clamped in position, correct saw/blade.  
Drilling: correct speed, drill angle, clamped securely.  
Polishing: goggles, using mop, no loose clothing. **[1]**
- (d)** Use of groove, rebate or applied beads/blocks.  
Materials used, tools/equipment used, accuracy of information. (3 × 1) **[3]**
- (e)** Some form of handle attached to 2 sides or jointed into top edge of 2 sides.  
Practical idea (0–2)  
Appropriate shape/sizes (0–2)  
Materials (0–1)  
Constructions and fittings (0–1)
- Cut out handholds:  
Practical idea (0–2)  
Appropriate shape/sizes (0–2)  
Constructions and tools/equipment (0–2) **[6]**

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- 12 (a)** Relatively cheap, plentiful, can be worked/joined in a variety of ways. (2 × 1) [2]
- (b) A** scribe, try square, marker pen, rule (1)  
**B** [centre/dot] punch, hammer (1)  
**C** dividers (1) [3]
- (c)** Held in vice (1)  
 Use of folding bars /scrap wood former (1)  
 Force required by hammer and scrap wood or mallet (1) [3]
- (d)** Description of method should include: preparation of metal to clean using file and/or emery cloth, flux joint, position on hearth with fire bricks, apply heat to bright red, apply spelter, allow to run, leave to cool (6 × 1) [6]
- (e)** Use of tap and tap wrench to produce thread in stand:  
 drill tapping size hole, insert tap into tap wrench, start cut, appropriate technique evident.  
 Award 0–3 dependent on technical accuracy, detail and quality of communication  
 Use of die and die stock to produce thread on arm:  
 Position die on end of rod, appropriate technique.  
 Award 0–3 dependent on technical accuracy, detail and quality of communication. [6]
- (f)** Some form of ‘stop’ or ‘cap’ shown clearly on end.  
 Relevant notes to support idea. (0–2) [2]
- (g)** Stand can be more stable by means of increased width of metal, additional base.  
 Practical idea stability side to side (1)  
 Stability front to back (1)  
 Both directions (2)  
 Heavier base (2) (0–2)  
 Relevant notes to support idea. (0–1) [3]
- 13 (a)** Plywood can be bent to shape easily, strength in all directions/ no grain weakness, can be finished well (2 × 1) [2]
- (b)** To check the appearance, check important sizes, prevents wasting resistant materials, can assist planning (2 × 1) [2]

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- (c) Use of male and female formers shown clearly (0–2)  
 Cork or rubber sheet between plywood and formers (0–1)  
 Pressure applied by means of cramps (0–1)  
 Accuracy /quality of communication (0–2)
- Use of vacuum forming bag award 4 × 1 for specific stages: use of former, adhesive, seal bag, withdraw air (0–4)  
 Accuracy /quality of communication (0–2) **[6]**
- (d) (i) The only joint that can work is a halving joint.  
 Award max. 2 marks for uneven ‘halves’  
 Award 0–3 marks dependent upon accuracy/quality of joint drawn **[3]**
- (ii) Wide variety of adhesives: generically, e.g. synthetic resin, PVA or trade names such as Cascamite, Aerolite, Resin ‘W’ **[1]**
- (e) (i) Stages in preparation include: glasspaper and cork rubber/block with 2 different grades, wipe dust off with a damp cloth.  
 Award 0–3 marks dependent upon the accuracy and detail provided. **[3]**
- (ii) Suitable finish: wide range of varnishes, preservatives and oils.  
 Award 1 mark for appropriate named finish.  
 Reason includes: enhance appearance, protect, preserve, keep clean.  
 Award 1 mark for sensible reason. **[2]**
- (f) Practical ideas: solid wood base, separate pieces attached to provide stability  
 Award 0–2 for a practical idea (0–2)  
 Methods of construction clearly shown/ appropriate (0–2)  
 2 important sizes (2 × 1) **[6]**