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**DESIGN AND TECHNOLOGY**

**0445/32**

Paper 3 Resistant Materials

**October/November 2016**

MARK SCHEME

Maximum Mark: 50

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**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.

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### Section A

- 1 **A** rip saw, cross cut saw, panel saw (1)  
**B** tenon saw, dovetail saw [not backsaw] (1)  
**C** coping saw (1) [3]
- 2 Metal spoon: stainless steel (1)  
Metal wire: copper, aluminium (1)  
Plastic bowl: polypropylene, PP, HDPE (1) [3]
- 3 Award 0–2 dependent upon accuracy of sketch 0–2 [2]
- 4 Marking gauge (1)  
Scriber (1)  
Odd legs, odd leg calipers [not calipers] (1) [3]
- 5 **(a)** Lines to be sawn down use a marking knife. Wood fibres are cut [1]  
**(b)** Sliding bevel, mitre square, combination square [1]
- 6 Channel: extrusion (1)  
Container: blow moulding (1) [2]
- 7 **(a)** Sketch shows tenon (1)  
Sketch shows haunch (1) [2]  
Must be shown in correct orientation  
**(b)** To lock the tenon to prevent it from moving/twisting  
stability/ more gluing area/increased strength [1]
- 8 **A** Countersink drill (1)  
**B** Flat bit (1) [2]
- 9 [Cold] chisel (1)  
Guillotine (1)  
Tinsnips (1) [3]
- 10 **(a)** Pine: wide range of adhesives. Accept generic and trade names such as PVA and Evo Stik  
Resin W, Cascamite, synthetic resin, Gorilla glue, contact/impact adhesive (1)  
**(b)** Epoxy resin, Araldite (1) [2]

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### Section B

- 11 (a)** 2 specification points: must be large enough to be seen at distance, must have clear and easy to read numbers, must be able to move hands freely, must be freestanding/wall-mounted  
Accept any sensible spec. points 2×1 [2]
- (b) (i)** 2 safety precautions include: wear safety glasses, mask, secure work, no trailing leads, tie hair/clothing out of the way, no obstructions below work piece 2×1 [2]
- (ii)** Award 0–2 on quality of description: for example, use of sanding disc fully described with plywood rotated against the disc to ensure smooth finish.  
Accept use of files. [2]
- (c)** Use of:  
coping saw, Hegner saw or equivalent, junior hacksaw saw to cut out waste (1)  
files to achieve shape (1)  
wet and dry paper to achieve smooth surface (1)  
polishing mop/compound to produce high quality finish (1) [4]
- (d)** Benefit: range of colours, inherent colours/self-finished, attractive [1]
- (e)** Some form of screw, bolt, pin or dowel (1)  
Hands retained at back and front (1)  
Spacers/washers to allow for movement (1) [3]
- (f)** CAD to design numbers: easy to change design, wide variety of fonts to try out. [1]  
CAM to make numbers: extremely accurate, more professional appearance and quicker to produce than alternative methods, identical quality. [1]  
Not faster/quicker without qualification.
- (g)** Some form of practical stand or support 0–3  
For maximum marks the stand/support must be clearly drawn showing how it functions  
Materials, fittings and constructions 0–2 [5]
- (h)** Some form of practical bracket attached to the back of the clock with provision for fixing to wall. Alternative method: plate with keyhole slot.  
Award 0–2 dependent upon accuracy of drawing. 0–2  
Materials, fittings and constructions 0–2 [4]

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- 12 (a)** 2 advantages: cheaper, does not warp/shrink, more readily available. 2×1 [2]
- (b) (i)** Use of blocks and pegs to position the mild steel rod against former  
Retention of end of rod (1) 0–2 [3]
- (ii)** Work hardened: metal is shaped by hammering (1)  
as a result metal becomes harder (1) [2]
- (c)** Preparation of ends before brazing: degreasing, filing, emery cloth 0–2
- Accept 4 stages in brazing process:  
Clamp ends together  
Set up on hearth  
Apply flux  
Apply heat  
Apply brazing rod/spelter  
Allow to cool 4×1  
Award 0–2 for technical accuracy of sketches 0–2 [8]
- (d)** Method of fixing allows for use of brackets, modifications to length and/or width  
of shelves. Practical idea 0–2  
Fix to shelf 0–1  
Fix to end frame 0–1  
Details of materials, fittings and fixings 0–2 [6]
- (e)** 2 reasons about aesthetics: for example, different appearance is more interesting, prefers  
combination of materials, lighter appearance 2×1 [2]
- (f)** Environmentally friendly materials:  
mild steel can be melted down and recycled [1]  
veneered chipboard uses waste materials not requiring trees to be chopped down [1]

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- 13 (a)** 2 properties: very hardwearing, tough, water resistant, attractive, gives a good finish  
2×1 [2]
- (b)** Method of support: vice or bench stop shown (1)  
Use of saw (1)  
Use of plane to remove waste (1)  
Use of glasspaper to make smooth (1)  
Technical accuracy: for example, named plane, saw, different grades of glasspaper  
0–1 [5]
- (c)** Some sort of bracket to which the rails can be attached  
Use of pin, rod or dowel through rails to allow them to rotate  
Method to keep rails apart: some form of spacer  
Details of materials and fittings used  
0–2  
0–2  
0–2  
0–2 [8]
- (d)** Practical idea. For maximum marks the method must be clear  
Holder must not rotate  
Some form of bracket attached to the back of the towel holder  
with provision for fixing to wall.  
Alternative method: plate with keyhole slot.  
Materials, fittings and constructions  
0–2  
0–1  
0–2 [5]
- (e) (i)** 2 reasons: hardwearing, attractive, allows natural colour/grain of wood to be seen,  
waterproof, protects wood  
2×1 [2]
- (ii)** 3 stages include:  
use of glasspaper [medium grade]  
wipe down surface/ remove dust  
use of glasspaper [fine grade]  
use of cork rubber/block stated  
3×1 [3]