

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

MARK SCHEME for the May/June 2009 question paper
for the guidance of teachers

0445 DESIGN AND TECHNOLOGY

0445/03

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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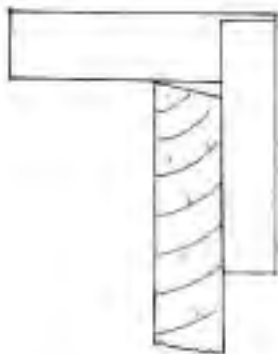
Page 2	Mark Scheme: Teachers' version	Syllabus	Paper
	IGCSE – May/June 2009	0445	03

Section A

1 (a) To protect the material being held from being scratched, damaged [1]

(b) Aluminium, tinfoil [1]

2



Try square shown in correct position 0–2 for accuracy [2]

3 The radius to be shaped requires a wider width of heat than that of a strip heater or line bender [2]

4 Pocket screwing, counterboring or use of screwed blocks. K-D fitting
0–2 dependent upon accuracy [2]

5 Malleable means the amount of shaping that can be done by hammering without the material breaking.
Reference to shaping/hammering 1 mark
Reference to breaking point 1 mark [2]

6 Wood: woodturning, turning [accept faceplate or between centres] [1]
Metal: centre lathe, casting, die-casting [1]
Plastic: injection moulding [1]

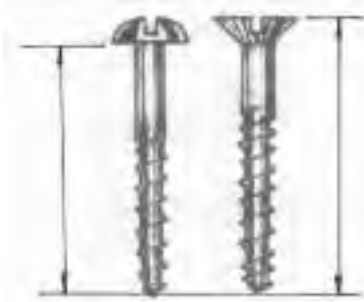
7 (a) Short grain. Accept lines along the wood [1]

(b) Two alternatives: turn wood to have grain going in different direction or
use a manufactured board to eliminate grain weakness [1]

8 Completed joint 0–3 dependent upon accuracy/clarity
Accept dovetail housing. Tongue and groove = 2 maximum [3]

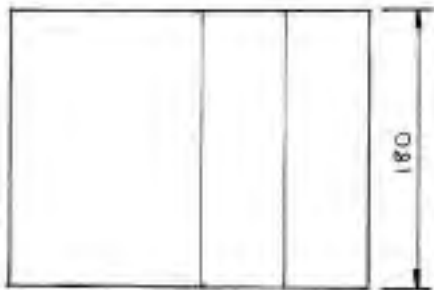
- 9 (a) Woodscrew A Roundhead [1]
 Woodscrew B Countersunk [1]

(b)



Length shown accurately for each woodscrew 2 × 1 [2]

10 (a)



1 mark for each correctly drawn bend line [2]

- (b) Reason for not using scribe is that it scratches and leaves a permanent mark
 Easier to see/read [1]

Page 4	Mark Scheme: Teachers' version	Syllabus	Paper
	IGCSE – May/June 2009	0445	03

Section B

- 11 (a) (i)** Suitable manufactured board: plywood, chipboard, blockboard, MDF [1]
- (ii)** Two advantages include: widths available, stability, cost (2 × 1) [2]
- (b)** Suitable KD fitting/accuracy of sketch (0–3)
 Details/position (0–1) [4]
- (c) (i)** Two marking out tools include: rule, try square, pencil, marking gauge, mortise gauge, marking knife (2 × 1) [2]
- (ii)** Four processes max. include: drill hole, remove saw blade – refit – saw shape, file to line (0–4)
 Accept description of miller/router/laser cutter process
 Correctly named tools (0–2) [6]
- (d) (i)** Advantage of spray paint: better quality finish/more even/no brush strokes [1]
- (ii)** Safety precaution relating to mask or ventilated area/eye protection [1]
- (e)** Practical design for lid either hinged or lift-off. Quality/accuracy (0–3)
 Details of fittings (0–1) [4]
- (f)** Method of holding steel: vice/clamp (1)
 Use of former: block (1)
 Method of force: hammer/scrap wood or mallet (1)
 Technical accuracy (1) [4]
- 12 (a)** Use of a former for R5 bend (1)
 Locating/locking/clamping for one end to be pulled against (1)
 Method of bending by hand or hammer or mallet (1)
 Technical accuracy (1) [4]
- (b)** Correct position/recognisable tool [2]
- (c) (i)** Centre drill [1]
- (ii)** Correct position/recognisable drill [2]
- (d)** Parting tool [1]

Page 5	Mark Scheme: Teachers' version	Syllabus	Paper
	IGCSE – May/June 2009	0445	03

- (e) Steel rod shown in vice ready to cut (0–2)
 Marked out using: rule, scribe (0–2)
 Sawn using: hacksaw (1) [5]
- (f) Preparation: use of file or emery cloth (1)
 Brazing process includes: apply flux, secure joint, position on hearth,
 apply heat, apply spelter, leave to cool
 Any 3 stages (0–3)
 Quality/accuracy of technical detail in sketch (0–2) [6]
- (g) Preparation shows 2 tubes with equal quantities being mixed (0–2)
 Reference to resin and hardener (1)
 Method of holding weights in position (1) [4]
- 13 (a) Three considerations include: secure lid closure, neat and tidy storage, ease of access,
 durable materials/construction, attractive appearance, separate compartments, easy to
 clean (3 × 1) [3]
- (b) Suitable plastic: polystyrene, HIPS, ABS, PVC, acrylic, 'Perspex' [1]
- (c) Two reasons for using manufactured board rather than solid wood: does not warp, twist or
 shrink, gives better surface finish due to absence of grain [MDF] (2 × 1) [2]
- (d) (i) Blocks need to have rounded corners, rounded/eased corners, taper/draft angle
 Description must include any 2 [2]
 (ii) Two stages in vacuum forming process include: clamping of plastic, correct heat zones,
 length of time heating plastic, raising of platen (2 × 1) [2]
- (e) (i) Two advantages of plastic tray: lift out enables cleaning of box, rounded corners
 inside tray enable easier cleaning, removal enables box to be used for other purpose,
 can be replaced, plastic is waterproof (2 × 1) [2]
 (ii) One advantage of wooden partitions: greater strength/durability [1]
- (f) Mitre joint marked out using a mitre square or sliding bevel
 Accuracy/quality of technical detail in sketch (0–2)
 Mitre joint cut to 45° using a saw with mitre box or mitre saw
 Accuracy/quality of technical detail in sketch (0–2) [4]

Page 6	Mark Scheme: Teachers' version	Syllabus	Paper
	IGCSE – May/June 2009	0445	03

- (g) Appropriate method: groove, rebate or applied strips (1)
 Accuracy/quality of technical detail in sketch (0–3) [4]
- (h) Suitable catch includes: magnetic or ball fitted inside or externally mounted catch
 Correct name (1)
 Accuracy of sketch of catch (0–2)
 Correct position (1) [4]