

**MARK SCHEME for the May/June 2007 question paper**

**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.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes must be read in conjunction with the question papers and the report on the examination.

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Page 2	Mark Scheme	Syllabus
	IGCSE – May/June 2007	CODE

Section A

- 1 (a) Riveting.
- (b) Nut and bolt, screw. [1]

2

Material	Property	Use
Copper	<b>Does not corrode</b>	Water pipes
<b>Phenol formaldehyde or specific wood</b>	Heat resistant	Saucepan handles
Blockboard	<b>Stable, available in wide boards</b>	Table top
<b>Stainless steel</b>	Resists corrosion	Kitchen sink

[4]

- 3 (a) Lathework, sanding disc, drilling machine and other machine processes. [1]
- (b) Any machine process where high level of noise is produced; e.g. routing, sawing. Must be specific operation that produces **loud** noise. [1]
- 4 Sketch of modesty bloc or two-piece bloc-joint fitting. 0-2 dependent upon accuracy. Award maximum 1 mark for none standard fitting that would work/ dowel. [2]
- 5 Chamfer to guide the dowel into the hole. [1]
- Saw-cuts to allow the glue to escape therefore allowing the dowel to be inserted. Larger gluing area. Allow air to escape. [1]
- 6 Butt hinge. [1]
- 7 (a) Countersink drill or bit. [1]
- (b) Tap. [1]
- 8 Dovetail nailing: at least two nails shown angled inwards. 0-2 dependent upon accuracy. [2]

Page 3	Mark Scheme	Syllabus
	IGCSE – May/June 2007	CODE

9

Product	Finish	Reason
Copper jewellery	<b>'Ercolene', lacquer or varnish Enamelling</b>	<b>Prevents tarnishing, allows natural colour of metal to be seen</b>
Handle of electrician's pliers	<b>Plastic coated</b>	<b>Electrical insulation</b>

Award 1 mark for correct reason if finish is incorrect. [4]

- 10 (a) Plastic heated using strip heater or line bender. [1]  
 Use of former, blocks or line bending jig to bend to shape. [1] [2]
- (b) Use of vice and scrapwood or folding bars. [1]  
 Appropriate force: hammer and scrapwood or soft faced hammer. [1] [2]
- Accept metal bender or anvil [0-2 dependent on detail].

### Section B

- 11 (a) (i) Plywood, MDF. [not blockboard, chipboard, laminboard] [1]
- (ii) Two reasons include: tough and durable, more economical to manufacture, stability of boards, widths available, cheaper. [1]  
 [1]
- (iii) 15 – 21 mm. [1]
- (b) (i) Some sort of 'pin' or bolt connecting wheel to steering column. [1]  
 Method of retention: nuts, caps. [1]  
 Use of washers to allow free rotation. [1] [3]
- (ii) Two methods of producing a wheel: woodturning lathe or saw and sand to shape.
- Woodturning details include: marking out, cutting off corners, screwing to faceplate, setting up on lathe, use of woodturning tool to produce round shape.  
 0-4 dependent upon accuracy of sketches and details provided.
- Sawing and sanding details to include: marking out, sawing off corners, use of sanding disc to produce round shape.  
 0-4 dependent upon accuracy of sketches and details provided. [4]

Page 4	Mark Scheme	Syllabus	er
	IGCSE – May/June 2007	CODE	

- (c) Handlebar shape and section appropriate for push along tricycle. [0-2]
- Comfort and grip shaped handlebar. [0-2]
- Method of construction: dowel joint. [0-2]
- Each part dependent upon accuracy of sketches and details provided. [6]
- (d) (i) Two reasons include: brightly coloured for child appeal, tough and durable finish. [1]  
[1]
- (ii) Two reasons include: each part could be coloured differently, easier to paint to a higher standard than assemble since it would be difficult to paint into corners. [1]  
Aesthetically pleasing, non-toxic. [1]
- (iii) Variety of acceptable stages include:
- wipe down surfaces after use of glasspaper, smooth surface using fine grade of glasspaper, seal knots, apply primer coat, apply undercoat, cover parts not to be painted. [4]
- 12 (a) Acrylic suitable: can be bent to shape, range of colours, readily coloured. [1]
- (b) (i) Chinagraph pencil, felt marker, rule, try square, sliding bevel, CAD. [1]  
[1]
- (ii) 4 basic operations:
- plastic held down or in the vice securely. [1]
  - use of appropriately named saw to cut off waste. [1]
  - use of sanding disc for outside edges / files for inside edges. [1]
  - wet and dry paper to make smooth. [1]
- accuracy / quality of sketches to show stages [0-2] [6]  
Accept laser and CAD dependent on detail.
- (c) 3 basic operations:
- plastic heated by means of strip heater / line bender. [2]
  - plastic bent using a jig or former. [2]
  - method of retention during cooling. [2]
- accuracy / quality of sketches to show stages [0-2] [8]
- (d) (i) Tensol. [1]
- (ii) Adequate ventilation, care taken not to get on skin, no naked flames, gloves, eye protection. [1]

<b>Page 5</b>	<b>Mark Scheme</b>	<b>Syllabus</b>	<b>er</b>
	<b>IGCSE – May/June 2007</b>	<b>CODE</b>	

- (e) Lid can be 'lift-off' or hinged / pivoted at back or side:
- lid covers desk tidy completely. [1]
  - practical details of lid operation; e.g. use of location blocks underneath lid for 'lift-off' type or method of hinging / pivoting clearly shown. [0-3]
- accuracy / quality of sketches to show stages. [0-2] [6]
- 13 (a)** Tough, durable. [1]
- (b) (i)** Scriber, try square, odd-leg calipers, centre punch, hammer. [1]  
[1]
- (ii)** Dividers. [1]
- (c) (i)** Hacksaw. [1]
- (ii)** File, milling machine, lathe. [1]
- (d) (i)** Variety of acceptable stages include:  
wire joint together, apply flux, place on brazing hearth, position bricks,  
use blowtorch to heat joint, apply brazing rod. [5]
- (ii)** Two safety precautions include: take care with blowtorch, use of tongs, face mask,  
gloves, goggles. [1]  
[1]
- (e) (i)** Draw file, emery cloth or wet and dry, degrease. [2]
- (ii)** Brush is quicker. [1]
- Spray gives better, even finish. [1]
- (f)** Completed design includes:
- speaker secured to arm. [0-2]
  - locked in any position. [0-2]
  - details of materials, fittings etc. [0-2]
  - quality of communication. [0-2] [8]