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UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the May/June 2011 question paper

for the guidance of teachers

0445 DESIGN AND TECHNOLOGY

0445/33 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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1 **(a)** Micrometer

(b) Accurate measurement [of thickness or diameter of materials]

2 Equal length flap drawn

Holes drawn in correct position in both flaps [2]

3 2 faults: fixing hole too large, hanging bars do not stop spade falling off, hanging bars are too thin (2 × 1)

Corrected: drill a smaller hole to screw to wall, angle holes for hanging bars, increase the size of the hanging bars (2 × 1) [4]

4 Complete drawing must show the staple. 0–2 marks dependent on technical accuracy [2]

5 **(a)** **A** die **B** tap [2]

(b) **A** to cut a thread on a rod or bar **B** to cut a thread inside a hole [2]

6 **(a)** plastic / polythene / dip-coated / rubber [1]

(b) olive oil or leave without a finish / sanded [1]

(c) 'Ercolene' or equivalent clear lacquer / enamelled [1]

7 Horizontal paring / chiselling [accept paring] [1]

8 Drawing dependent upon technical accuracy (0–2) [2]
Award 1 mark for saw drawn without a back.

9 Plastic granules heated to liquid form

Forced by screw into injector

Injected into mould [3]

10 **A** Cold chisel

B Ball pein hammer / engineering hammer. Accept ball hammer. [2]

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11 (a) (i) Beech is tough, durable, hardwearing, straight grained, close grained, finishes well, smooth, hard (2 × 1) [2]

(ii) Plastics are lightweight, colourful, attractive, can be moulded into shape, non-toxic, self-finished, clean (2 × 1) [2]

(b) Look for following features:

Wheel can be joined using a screw or threaded rod or rod used as an axle
Use of star washer on end of rod or axle
Screw shown fixed into edge of base
Clearance holes identified
Correct use of washers [4]

(c) Award 0–3 for details of marking out (0–3)

Award 0–3 for details of cutting out shape (0–3)
Each stage must include appropriately named tools and equipment with accurately drawn details [6]

(d) Practical idea: connects, stays together, can be removed (0–3)

Technical details (0–2) [5]

(e) Preparation of material: marked out, edges planed, saw cut in 1 end, grease applied to dead centre (0–3)

Description of process: wood mounted between centres, tee rest positioned and wood rotated by hand to test for clearance, scraper or gouge used to achieve shape (0–3) [6]

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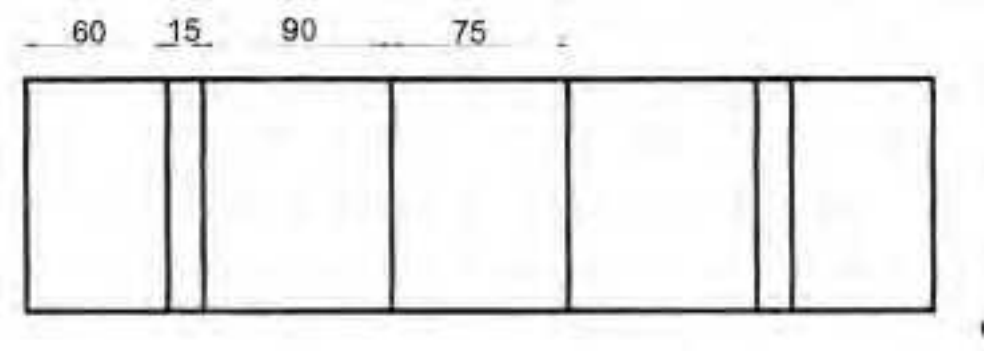
12 (a)



(6 × 1) [6]

(b) (i) sheet saw, hacksaw, tenon saw [1]

(ii) Hegner saw, band saw, scroll saw or equivalent. [1]

(iii) Use safety glasses, ear defenders [1]

(c) Sketches and notes should include the following details:

filing / scraper
use of wet and dry paper [various grades rewarded]
polishing mop / compound
polishing wheel / buffer / buffing machine [4]
Any 4 responses

(d) Heat to soften plastic
Use of strip heater or line bender
Use of formers to bend around or setting up of line bender
Method of holding / retention
Correct sequence (0–2) [6]

(e) (i) Sliding bevel to mark out the sloping lines on the ends of the block

Sliding bevel can be reversed to complete both pairs of lines [2]

(ii) Shape produced by 'wasting' and 'cleaning up'

Wasting: planing – wood held in a vice or sawing using a tenon saw with work held on bench top, or use of band saw (0–2)

Cleaning up: glasspapering – use of various grades and cork rubber / block (0–2) [4]

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13 (a)

Part	Length	Width	Thickness	Material	Number off
Handle	2600	Ø25		Mild steel tube	1
Axle	680	20	20	Mild steel tube	1
Scoop	600	200	2	Mild steel	1
Wheels		Ø75	25	Nylon	2

[5]

(b)

2 tabs (2 × 1)
2 cut lines (2 × 1)
4 holes (0–2) [6]

(c) Processes involved include:

Drill both tabs and scoop. Clean off any burrs.
Support the rivet head with a dolly held in the vice.
Swell the rivet with the flat face of a hammer until it is tight in its hole.
Use the ball-pein to shape the head.
Finish the head with the snap to make a smooth shape.

Award marks on basis: low level of understanding / lack of accurate details (0–2)
reasonable level of understanding (3–4)
good level of understanding (5–6) [6]

(d) (i) Nylon is self-lubricating [1]

(ii) Injection moulding [1]

(e) (i) Hole drilled in axle
Split pin shown in position
Correct position of washer between split pin and wheel [3]

(ii) Screw thread on end of axle
Nut on end of axle
Correct position of washer between nut and wheel [3]