CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International General Certificate of Secondary Education

MARK SCHEME for the October/November 2015 series

0445 DESIGN AND TECHNOLOGY

0445/33 Paper 3 (Resistant Materials), maximum raw mark 50

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CAMBRIDGE
International Examinations

Section A

1 **(a)** **(i)** Length shown along whole of screw (1)

(ii) Length shown from under round head (1) **[2]**

(b) Gauge is the diameter of the screw thread **[1]**

2 **(a)** Acrylic, 'perspex', polystyrene, ABS **[1]**

(b) Two properties: easily moulded to shape, weather resistant, inherent colour, durable, lightweight, transparent, translucent (2 × 1) **[2]**

3 Completed drawing of G cramp.
Award (0–2) dependent on technical accuracy **[2]**

4 Plane off sharp edges using a plane/Surform/rasp/file (1)
Finish with glasspaper (1) **[2]**
Use of router with appropriate shaped cutter (0–2)

5 **(a)** Vacuum forming, injection moulding **[1]**

(b) For added strength and rigidity **[1]**

6 **(a)** [sand] Casting **[1]**

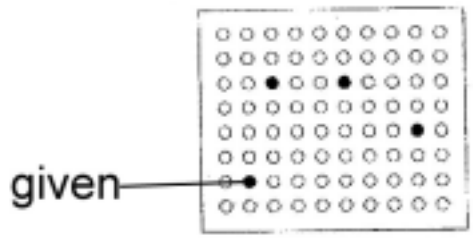
(b) Aluminium, brass, iron **[1]**

7 **(a)** Polystyrene, styrofoam **[1]**

(b) Two advantages: much quicker to produce, can be moulded to exact shape, more comfortable, additional shaping not required (2 × 1) **[2]**

8 Completed drawing of jaws: 2 'vees'
Award (0–2) dependent on technical accuracy **[2]**

9 Award 3 marks for each correct peg position (3 × 1) **[3]**



10 **A** Blowtorch (1)
B [fire] Bricks, hearth (1)
C Solder (1) **[3]**

Section B

11 **(a)** Two tools: marker pen, rule, try square (2 × 1) **[2]**

(b) Two precautions: correct drill speed, sheet clamped down, supported underneath (2 × 1) **[2]**

(c) Stages include:
Heat plastic on strip heater/line bender (1)
Shape around a mould/former (1)
Retain in position while plastic cools down (1) **[3]**

(d) Notes to include: plastic granules fed into hopper, a screw moves them along the chamber, heated to make soft, forced through a die of the required shape (4 × 1) **[4]**

(e) Practical idea: partition of appropriate length and height shown on base (0–2)
Constructional details (0–2)
Sizes (0–1) **[5]**

(f) Hooks sawn to length using hacksaw and held in vice,
tenon saw and bench hook, Scroll/Hegner saw without vice (0–2)
Sawn ends filed (1) while held in vice (1) (0–2)
Hooks cemented into holes (0–1) **[5]**

(g) Some form of bracket attached to the wall and back of rack,
extended back folded and slotted (0–2)
Constructional details and sizes (0–2) **[4]**

12 **(a)** Figure and grain, colour, stability (2 × 1) **[2]**

(b) To prevent the wood from shrinking, twisting, warping **[1]**

(c) (i) To hide the unattractive edges and make it look like solid wood, less likely to chip **[1]**

(ii) Solid wood or [iron-on] veneer **[1]**

(d) Mortise and tenon, dowel
Completed drawing of joint: award (0–3) dependent on technical accuracy **[3]**
Named joint to correspond with sketch must be appropriate **[1]**

(e) (i) Jack or smoothing plane **[1]**

(ii) Leg shown at an angle in vice so that planing is horizontal
Vice drawn (1)
Leg at an angle (1) **[2]**

(f) Methods include: counterbored hole for screw, pocket screw, wooden button, shrinkage plate, KD fitting, dowelled from underneath
Appropriate method (1)
Technical accuracy of sketch (0–3) **[4]**
Any holes through top = 0 marks

(g) (i) Stages include:
Drill hole for saw blade (1)
Cut out shape using a Scroll saw [or equivalent], jig saw (1)
Make smooth using a [small] plane, e.g. block plane and files (1)
Technical accuracy of method/sketch (0–1)
Allow router: for maximum marks details must be provided **[4]**

(ii) Beads along all 4 edges (1)
Pinned or screwed and glued to edges (1)
Appropriate sizes (1)
OR
Rebated edges (1)
Method of producing rebate (1)
Appropriate sizes (1) **[3]**

(h) Environmentally friendly:
using wood that can be replaced, reforestation, using recycled wood based materials **[2]**

13 (a) (i) Scriber, try square, rule, odd-legs, engineers blue (2×1) **[2]**

(ii) Three stages:
Drill hole to insert blade of abra file, jig saw, Scroll saw [with metal cutting blade], cold chisel
Cut out waste
File flat and smooth
Award (0–2) marks for each stage shown clearly (3×2) **[6]**

(b) (i) Plastic/dip coated, [spray] painted **[1]**

(ii) Stages include: clean surface of metal, use of at least 2 different grit wet and dry [silicon carbide] paper, use of polishing mop with appropriate compound **[3]**

(c) Stages include: use of former around which sheet metal will be shaped, held in position while bent using a soft-faced mallet or hammer and scrapwood
Former (1)
Held in position (1)
Method of force (1)
Technical accuracy (1) **[4]**

(d) Modification to existing rack allows for quick and easy connection:
Clips, slides, overlaps (0–2)
Details of materials and sizes (0–2) **[4]**

(e) Modification will include some method of lifting the edges off the polished surface or will cover the edges with a material that will not scratch, folded edges
Appropriate modification (0–2)
Details of materials and constructions (0–2) **[4]**

(f) Reason for limited lifetime is that DVDs will become obsolete as new technologies are developed **[1]**