MARK SCHEME for the October/November 2015 series

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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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)
Use of router with appropriate shaped cutter (0–2) **[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]**
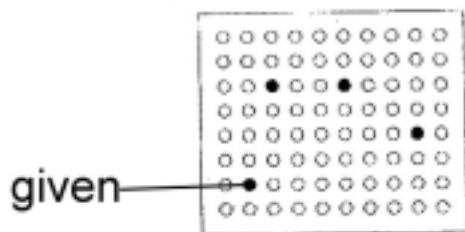
10 A Blowtorch (1)
  B [fire] Bricks, hearth (1)
  C Solder (1) **[3]**

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]**

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(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]**