**CAMBRIDGE INTERNATIONAL EXAMINATIONS**

**Cambridge International General Certificate of Secondary Education**

# MARK SCHEME for the October/November 2015 series

## 0445 DESIGN AND TECHNOLOGY

**0445/32** 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.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

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## Section A

**1** Three pieces of information: length, thread diameter, type of head, quantity, material
(3 × 1) **[3]**

**2** Completed drawing of coping saw
Award (0–2) dependent on technical accuracy **[2]**

**3** **(a)** Sash cramp/F cramp (1)

**(b)** To protect, apply even pressure (1) **[2]**

**4** Polymorph, nitinol (2 × 1) **[2]**

**5**

| Tool | Specific name | Specific use |
|---|---|---|
|  | **Outside calipers** | **Measuring outside diameters** |
|  | **Brace** | **Drilling/boring holes** |

**[4]**

**6** **(a)** Allows cheaper manufactured boards to appear as solid wood (1)

**(b)** Less durable, can be damaged easily (1) **[2]**

**7** Corner strengthened: triangular plates, corrugated fastener, dowel, metal pins, feather, wooden block, modesty block
Use of nails: award 1 mark only if 2 nails are shown
Do not accept use of screws or bolts through end
Award (0–2) dependent on technical accuracy **[2]**

**8** **(a)** [sand] Casting, die-casting (1)

**(b)** Self-finished, anodised, spray paint, dip coat, lacquer (1) **[2]**

**9** Accept any 3 from: drill hole, insert blade of coping or scroll saw and cut out waste, file flat, chisel, glasspaper (3 × 1) **[3]**

**10** **(a)** Lamination, steam bending (1)

**(b)** Mortise and tenon, dowel (1)

**(c)** Less constructions to produce, stronger overall form, inherent flexibility in chair, more stable, more comfortable (1) **[3]**

## Section B

**11** **(a)** **(i)** Lower costs than ready assembled furniture, ready collected, satisfaction of assembling at home (2 × 1) **[2]**

**(ii)** Less storage space required, fewer manufacturing processes means quicker production, competitive costs (2 × 1) **[2]**

**(b)** Recognised KD fitting: corner/modesty block (0–2)
Added notes (0–2) **[4]**
Use of dowel or screws award 1 mark max.

**(c)** Accurate sketch of pre-manufactured component runner or use of grooves [cut or applied]
Award (0–2) dependent on technical accuracy (0–2)
Additional notes (0–2) **[4]**

**(d)** **(i)** Two advantages: even application possible, no brush strokes, faster, smoother (2 × 1) **[2]**

**(ii)** Well ventilated room, face mask, safety glasses (2 × 1) **[2]**

**(e)** Accept any sensible positive or negative evaluative comments about computer desks generic

**(i)** Safety: corners are rounded, the desk is stable in use **[2]**

**(ii)** Good space for keyboard monitor etc. attractive painted finish, clean simple form **[2]**

**(iii)** Use of manufactured board is economical, minimal constructions/self-assembly reduces cost of product **[2]**

**(f)** Limited lifetime issues include:

- *materials such as manufactured board may not be as long lasting as solid wood*
- *constructions such as KD fittings dependent on strength of screw thread may not be considered long lasting; over time, in use, KD fittings may become worn*
- *fashion can dictate the change for furniture of this type*
- *technological developments means that tables to accommodate computers etc. may become obsolete*

Award (0–3) dependent on quality of explanation **[3]**

**12 (a)** Durable metal, relatively cheap, easily worked/shaped, resist high temperatures

(2 × 1) **[2]**

**(b)** Steel will rust if not protected, improved appearance **[1]**

**(c)** Cutting: mild steel sheet cut using bench shears or tinsnips (0–2)
partial success using hacksaw or cold chisel (1 maximum)
Award 1 mark for sketch of correct tool
Award 1 mark for correctly named tool
Holding: mild steel sheet held by hand or clamped to a bench (0–2) **[4]**

**(d)** Mild steel sheet held in vice (1)
Use of former/block of wood (1)
Method of force: hammer and scrapwood or mallet (1) **[3]**

**(e)** Sketch showing use of: riveting, weld, braze (0–2) **[2]**

**(f)** Practical idea for support (0–2)

Named materials (0–2)

Two important sizes [500 mm height given] (0–2)

Method of joining temporarily (0–2) **[8]**

**(g)** Practical idea: three tools safely held allowing for ease of access (0–3)
Details of materials and constructions (0–2)
Use of wood joined to barbecue body inappropriate **[5]**

**13 (a) (i)** Polystyrene, acrylic, polypropylene, ABS, HIPS **[1]**

**(ii)** No grain marks, stable, will not warp, smooth surface, easy to shape, no splinters (2 × 1) **[2]**

**(iii)** Draft angle, rounded corners, no undercuts, smooth finish, air vents (2 × 1) **[2]**

**(b)** Award 0–5 for specific stages: (0–5)
Place mould in machine [on platen]
Clamp plastic in place
Bring heater across to soften plastic
Check flexibility of plastic
Bring up mould into soft plastic
Turn pump on to remove air
Remove from moulded plastic
Lower mould [on platen] and leave to cool

Award (0–3) for technical quality of sketches (0–3) **[8]**

**(c) (i)** Injection moulding **[1]**

**(ii)** Manufactured board top needs to be clamped down on drilling machine table or to a workbench (1)
Use of scrap wood under work piece (1)
Method of clamping (1) **[3]**

**(iii)** Appropriate method:
pin or screw (1)
glue top to sides (1)
Added details (0–2) **[3]**

**(d)** Practical idea showing 3 paintbrushes safely stored with ease of access (0–3)
Details of materials, constructions, sizes (0–2) **[5]**