CAMBRIDGE INTERNATIONAL EXAMINATIONS
Cambridge International General Certificate of Secondary Education

MARK SCHEME for the October/November 2015 series

0445 DESIGN AND TECHNOLOGY

0445/31   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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CAMBRIDGE
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Section A

1 **A** Scroll saw, Hegner, vibro
   B Jigsaw (2×1) **[2]**

2 **A** Phillips, posidrive, cross head
   B Straight/slotted/flat slot (2×1) **[2]**

3 **(a)** Polyester resin (1)

   (b) Epoxy resin (1) **[2]**

4 **(a)** Riveting [not pop riveting] (1)

   (b) Soldering, brazing, welding (1) **[2]**

5 **A** Tool post/holder
   B Tailstock
   C Bed (3×1) **[3]**

6 Completed drawing of tee hinge
   Award (0–2) dependent on technical accuracy **[2]**

7 Two benefits: high tensile strength, lightweight, flexible, complex shapes,
   shock/impact resistant (2×1) **[2]**

8

Tool	Specific name	Specific use
	Cross pein, warrington, pin hammer	Hammering in pins Starting off nails
	Claw hammer	Pulling out nails Hammering in nails

[4]

9 A Mould
  B Hopper
  C Feed screw   (3 × 1) **[3]**

10 Template with 2 holes drilled (1)
   Located against 1 end/edge (1)
   Located against 1 end and 1 edge (1)   **[3]**
   Accept genuine drilling jigs

Section B

11 (a) (i) Correct length of tray including shaped ends (1)
       Correct width of tray (1)
       Corners to be cut out shown (1)
       Correct bend lines (1)
       Correct cut lines (1)   **[5]**

   (ii) Marker pen lines can be erased if errors are made, do not scratch   **[1]**

   (iii) Two reasons: to allow for better fitting bends, to clean tray
        Improved appearance, ease of bending   (2 × 1) **[2]**

   (b) Three stages include: draw file, use of wet and dry [silicon carbide paper],
       different grades used, scraper, buffing/polishing machine, polishing mop,
       polishing compound   (3 × 1) **[3]**

   (c) (i) 4 stages:
        Drill hole
        Insert coping saw blade or Hegner saw blade [or equivalent] and saw to line
        File shape smooth
        Use of wet and dry [silicon carbide] paper   (4 × 1) **[4]**
        Accept laser cutter. For maximum marks details must be given.

   (ii) Consideration of how a person would grip/hold the tray for carrying   **[1]**

   (d) 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]**

   (e) Details of the material from which the handle is made and sizes (0–2)
       How the handle would be made in a school workshop (0–2)
       The method of attaching the handle securely to the tray (0–2)   **[6]**

12 (a) Chipboard, plywood, MDF, laminboard, blockboard **[1]**

(b) Veneer can become chipped, split or damaged – not easily repaired **[1]**

(c) Practical idea: some form of lipping, edging, 'frame' (0–2)
Named materials appropriate (1)
Methods of construction (1)
3 sizes (1) **[5]**

(d) Some form of metal plate, welded tube, brackets or block of wood attached to underside (0–2)
Stand joined appropriately to plate, tube, brackets or block (0–2)
Accuracy of technical detail inc. sizes, materials (0–1) **[5]**

(e) Practical method: gusset plate, brace in 2 directions (0–2)

Materials, sizes and constructions (0–2) **[4]**

(f) Inner and outer tubes [or equivalent] give adjustment (0–2)

Method of adjustment and locking: screw, nut and bolt, spring pin (0–2)

Materials, sizes and constructions [accept 2 from 3] (0–2) **[6]**

(g) Reference to dimensions of human form (1)
Reference to specific dimensions: e.g. reach (1)
How this is related to the design of the bedside table (1) **[3]**
For maximum marks explanation must say **HOW** it is used.

13 (a) Three specification points must be written as a specification:
appropriate dimensions [accept only one of length, width, height] adequate surface for drinks etc. surface for magazines/newspapers/books.
Accept any sensible point that a designer would consider. (3 × 1) **[3]**

(b) Use of male and female formers (2)
Veneers and glue (1)
Cramps (1)
Technical detail (1) **[5]**

(c) (i) Marking knife, try square, marking gauge, cutting gauge (2 × 1) **[2]**

(ii) Scroll saw or Hegner saw used to cut out (1)
Use of mallet and chisel to cut out waste (1) **[2]**

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(d) (i) The glasspaper is wrapped around the cork block to apply even pressure (1)

   (ii) A damp cloth is used to remove sawdust (1)

   (iii) Two different grades of glasspaper are used to produce a smoother surface (1)   **[3]**

(e) (i) To protect against spillages, preserve, better appearance   (2 × 1)   **[2]**

   (ii) [Polyurethane] varnish, wax, variety of oils/polishes   **[1]**

   (iii) No runs, drips, brush strokes same direction   **[1]**

(f) Two advantages of laminated construction:
   stronger overall form since no joints are used, quicker to batch produce as formers can be reused, smoother/rounded shape   (2 × 1)   **[2]**

(g) (i) Computer can be used to research existing products via internet, can be used to collate data from questionnaires and produce results in table or chart form   **[2]**

   (ii) CAD software can be used to design the coffee table making available a wide range of on-screen modelling techniques   **[2]**