UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the October/November 2007 question paper

0445 DESIGN AND TECHNOLOGY

0445/03 Paper 3 (Realisation), 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.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

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International Examinations

Section A

1 **(a)** Piercing saw, abra file saw. Not handsaw. [1]

(b) Coping saw, fret, vibro, 'Hegner', 'Scroll'. **Not** jig saw. [1]

2 **(a)** Must be a specific use or example: e.g. gluing plastic laminates to manufactured boards. [1]

(b) Gluing wide variety of products together made from different materials: wood to metal, metal to glass, wood to plastics, metal to plastics. [1]

3 0–2 dependent upon accuracy of joint sketched. [2]

4

Product	Specific plastic
Packaging and insulation	**[Expanded] polystyrene**
Electrical fittings	**Urea formaldehyde**
Gear wheels	**Nylon**
Buckets and bowls	**[High density] polythene, polypropylene**

[4]

5 Must be 2 different methods.

1 Measure diagonal distances. [1]

2 Try square. Accept square but **not** set square.
Square can be used on outside of frame. [1]

6 0–2 dependent upon accuracy of sketch.
Odd number of layers =1 mark. Direction of grain / notes to explain = 1 mark. [2]

7 **(a)** [Outside] calipers, micrometer, vernier. [1]

(b) Centre square, centre lathe, odd leg calipers. [1]

8 **(a)** Provides grip. [1]

(b) Centre lathe. (1)
Use of a knurling tool. (1) [2]

9 Two tools include: mortise gauge, try square, marking knife, cutting gauge, [1]
pencil, rule. [1]

10 **(a)** Sash, bar cramps, pipe cramps. [1]

(b) Cramps shown evenly spaced. (1)
Two on top and one underneath or vice versa. (0–2) [3]

Section B

11 (a) (i) MDF, chipboard, plywood. **Not** blockboard. [1]

(ii) More stable, available in wide boards, cheaper than solid wood. (1 + 1) [2]

(iii) 15–21mm. [1]

(b) (i) Try square, marking knife, pencil, rule. Accept square but **not** set square. (1 + 1) [2]

(ii) Space is to allow for waste due to the saw-cut. [2]

(iii) Jig-saw, cross-cut saw, panel saw, sheet saw, circular saw. [1]
Not band, rip or back saw.

(iv) Apply masking tape to both sides of the line to be sawn, or
use of knife to cut fibres of manufactured board to avoid splintering = 2 marks.
Use of finer toothed saw = 1 mark.
Use of scrapwood underneath manufactured board = 2 marks.
Reference to filing, and/or planing and/or sanding **after** sawing = 1 mark. [2]

(c) (i) Appropriate K-D fitting used: including screws, dowel and pins. [1]
Correct position of fitting to join shelf to end panel. [1]
Parts joined together; not just supported. [1]
Quality of communication including notes and sketches. [1] [4]

(ii) Appropriate joint used, e.g. dowel, housing. **Not** nail. [1]
Use of adhesive stated. [1]
Technical detail/communication. [0–2] [4]

(d) Drawer located by means of grooves and/or applied strips [runners].

- Appropriate method: use of runners/grooves on side of drawer and corresponding position on end panel. [0–2]
- Details of materials, fittings and fixings used. [0–2]
- Quality of communication/ sketches and notes. [0–2] [6]

12 (a) (i) Polystyrene. **Not** HIPS. [1]

(ii) Wide variety of products include: food containers, disposable cups, 'fridge linings, cutlery trays. **Not** bath tubs. (1 + 1) [2]

(b) Draw or sloping slides to assist release. [1]
Curved/rounded edges/ corners. [1]
Air holes to assist drape of plastic over former. [1]

(c) 3 main operations: Marking out, holding and sawing, smoothing and rounding.

Details include:

- Marking out on 2 opposite faces only, using a rule and pencil, sliding bevel, try square. [0–2] **M**

- Block held by means of a G cramp and/or hold fast to enable shape to be sawn.
  Vice only = 0 marks. Requires explanation.
  Method of holding: [0–1] **H**
  Method/name of saw: [0–1] **S**

- Sides smoothed by means of plane followed by glasspaper.
  Corners rounded using files and glasspaper. [0–2] **S** [6]
  Any 2 from 3: plane, files, glasspaper for 2 marks.

(d) Stages include:

Turn on heater, lower platen, wait for plastic to become soft, raise platen, turn on pump to suck out air, turn off pump, lower platen, leave to cool, unclamp plastic. [5 x 1] [5]

(e) Base can be made from plastic or wood-based material.
Base could be inserted from underneath using 'thick' material with locating pegs/pins to fix in position.

Base could be slid into position by extending and folding over 2 sides.

Practical idea and details of materials/modifications. [0–3]
Accuracy/quality of communication. [0–3] [6]

(f) Advantage: can be manufactured quickly once the mould has been produced. [1]
Inherent colours to avoid finishing.
Disadvantage: not as durable as wood. [1]

13 (a) (i) Scriber, rule, felt marker, odd-leg calipers, dot/centre punch, sliding bevel, try quare. (1 + 1 + 1)
Do **not** accept square or dividers. [3]

(ii) Template made from paper or card could be drawn out quickly and placed on the mild steel sheet allowing the shape to drawn around or the template could be glued directly onto the mild steel sheet. [2]

(iii) Correct position of 4 tabs: [4x1] [4]
Inappropriate shape/size of tabs = 3 marks maximum.
8 tabs drawn = 2 marks maximum.

(b) Tin snips, hacksaw, cold chisel, shears, guillotine, jig saw, Hegner saw, scroll saw, abra file saw. (1 + 1) [2]

(c) (i) Triangular / three square file. [1]

(ii) Method of clamping: use of vice or bench top. [1] **V**
Appropriate method of support: wooden blocks or folding bars. [1] **S**
Technical accuracy. [0–2] **T** [4]

(d) Drill can snag in the material and cause it to spin, distorting the hole and causing possible accident if material is not clamped down. [2]

(e) To protect the mild steel from corrosion. [1]
To improve its appearance. [1]

(f) Practical method of joining: base fits inside top from underneath, fixed in position by means of pins, screws, nuts and bolts. [0–2]

Retained at 2 ends or on 2 sides. [1]

Details of fittings, fixings, modifications. [0–2] [5]