

**CAMBRIDGE INTERNATIONAL EXAMINATIONS**

**GCE Ordinary Level**

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## **MARK SCHEME for the October/November 2012 series**

### **6043 DESIGN AND TECHNOLOGY**

**6043/01**

Paper 1, maximum raw mark 95

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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|               |  |                 |  |
|---------------|--|-----------------|--|
| <b>Page 2</b> | <b>Mark Scheme</b>                         | <b>Syllabus</b> |  |
|               | <b>GCE O LEVEL – October/November 2012</b> | <b>6043</b>     |  |

**Part A**

- 1 Any three processed timber boards from hardboard, plywood, chipboard, blockboard, laminated softboard, etc. (1 × 3) [3]
- 2 Two reasons from lightweight, easy shape, easy to clean, waterproof, etc. (1 × 2) [2]
- 3 Two metals named – lead and tin. (1 × 2) [2]
- 4 Sketches of joints.
  - (a) mortice and ten.
  - (b) dowel joint. (2 × 2) [4]
- 5 Meaning of ‘realisation’ – once a design is complete and the working drawing and cutting list are complete the practical work can start. (1 × 3) [3]
- 6 Two plastics named.
  - (a) melamine (will accept trade name).
  - (b) polythene. (1 × 2) [2]
- 7 Three details for screws from – quantity, length, gauge, material, type of head, slot. (1 × 3) [3]
- 8 Process explained.
  - (a) blow moulding (free). (1 × 1) [1]
  - (b) heated first. (1 × 1) [1]
- 9 Reason for lubricant- it disperses heat, assists in the dispersal of the chips, helps give a better finish, prevents tool from braking. (1 × 2) [2]
- 10 Tools named and uses given.
  - (a) bossing mallet used for hollowing sheet material.
  - (b) ball-pein hammer used for general metalwork such as riveting, etc. (2 × 2) [4]

|        |                                     |          |
|--------|-------------------------------------|----------|
| Page 3 | Mark Scheme                         | Syllabus |
|        | GCE O LEVEL – October/November 2012 | 6043     |

**Part B**

- 11 (a) (i)** Breathing problems can be caused by material dust, fumes from mixing materials such as resin and a catalyst/particles/unventilated rooms, etc.
- (ii)** Eye problems – particles/dirt/dust flying when polishing/grinding/sanding materials, etc.
- (iii)** Skin problems – burns from hot metal/acid/infections from catalyst, and other substances. (3 × 3) [9]
- (b)** Three types of protective clothing or equipment stated and reasons for use. Such as apron, gloves, face mask, goggles, tongs, etc. (2 × 3) [6]
- (c)** Danger of badly maintained tools, blunt tools require undue force, may slip or break, parts of tools may come loose. (1 × 2) [2]
- 12 (a)** Three tools identified and purpose stated.
- A** – The flat file is a general purpose tool for shaping and smoothing metal.
- B** – The bevel-edge chisel is ideal for wood joints as it can get into acute corners.
- C** – The cold chisel is for cutting, shearing or chipping metal. (2 × 3) [6]
- (b)** The reasons explained.
- (i)** The ferrule fits around the chisel neck and provides a strong support for the wood and blade. It stops the wooden handle from breaking.
- (ii)** The two angles are – grinding angle to give the blade a wedge shape and the sharpening angle to give a strong cutting edge.
- (iii)** The head of the chisel is left soft because in use it has to be hit with a hammer, if was hard like the cutting edge it would break. (2 × 3) [6]
- (c)** Sketches explaining the how work needs to be held in different positions to prevent movement. (1 × 5) [5]
- 13 (a)** A reason for selection and rejection.
- (i)** Acrylic – colourful, clear, easy to clean, lightweight, smooth to the touch, etc. Cold, difficult to have different coloured parts, quite brittle, etc.
- (ii)** Aluminium – strong, will not corrode, each piece can be coloured differently, quite lightweight, etc. Harder to work and finish than acrylic or plywood, sharp edges, cold, etc.
- (iii)** Plywood – able to have a range of finishes, very easy to work, very lightweight, etc. May splinter and break at the edges, not durable, etc. (2 × 3) [6]

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|---------------|--|-----------------|-------------|
| <b>Page 4</b> | <b>Mark Scheme</b>                         | <b>Syllabus</b> | <b>6043</b> |
|               | <b>GCE O LEVEL – October/November 2012</b> |                 |             |

- (b) Because by cutting the pieces from a single disc they automatically fit together to form a puzzle shape. Cutting out separate pieces would have little chance of fitting together. (1 × 2) [2]
- (c) Sketches of suitable tools –
- (i) from dividers, compass, etc.
- (ii) from woodworkers/ engineers vice, G-cramp, etc.
- (iii) from coping, fret, piercing, band, etc. (3 × 3) [9]
- 14 (a)** Two properties from – lightweight, waterproof, easy to clean, colourful, hygienic, tough, etc. (1 × 2) [2]
- (b) Notes and sketches describing –
- (i) Marking out and drilling shelves – process involving ruler, scribe, try square, odd legs, working three shelves together, support, drill, size, speed, action, etc. (1 × 7) [7]
- (ii) Working column of the lathe, turning down to size at one end, centre and the drilling second end, threading hole and reduced end, tools, action, etc. (1 × 8) [8]
- 15 (a)** Two methods of production from – working from solid, casting, injection moulding, etc. (2 × 2) [4]
- (b) Major stages in making letter – tools or equipment must relate to material, such as making a split mould, plastic granules, hopper, heater, screw, ram, injection, cooling, etc. (1 × 10) [10]
- (c) May be paint, tape, grooves, etc. – action, masking, spacing, brush, pad, pen, time, coats, etc. (1 × 3) [3]
- 16 (a)** Suitable sheet material such as mild steel, aluminium, acrylic, beech, veneers, etc. strong, durable, easy to shape, etc. (1 × 2) [2]
- (b) Processes described – actions and tools must relate to chosen material.
- (i) Marking out – metal would be scribe, odd legs, engineers square, dividers, dot punch, centre punch, etc.
- (ii) Cutting to shape – wood would be woodworkers vice, G-cramp, tenon saw, coping saw, chisel, abrasive material, etc.
- (iii) Forming bend – plastic would be making former, strip heater, heating plastic, state, gloves, bending, cooling, etc. (3 × 4) [12]
- (c) Sketches showing method of fixing – may be screws, countersunk, round head, screw method – slot/posi-drive. nut and bolt, coach bolts, washer, etc. (1 × 3) [3]

|        |                                     |          |
|--------|-------------------------------------|----------|
| Page 5 | Mark Scheme                         | Syllabus |
|        | GCE O LEVEL – October/November 2012 | 6043     |

17 Notes and sketches on two of the following –

- (a) Hardening and tempering – cleaning metal, material, heating, torch, red heat, quenching, water, cleaning metal, heating, colour, 300 c, blue, quench, etc.
- (b) Plastic coating – cleaning metal, material, fluidizing tank, method of holding work, heat, method, temp – 180 c, air action, dipping, reheating, cooling, etc.
- (c) Marking and cutting dovetail – pencil, marking knife, ruler, bevel, dovetail template, try square, woodworker vice, G-cramp, tenon saw, bevelled edge chisel, etc.

(1 × 8 × 2 + 1) [17]

18 (a) Suitable material such as acrylic, ash, silver, etc. with reasons such as colour, ease of construction, weight, non-tarnish, etc. (1 × 2) [2]

(b) Notes and sketches of –

- (i) Making – must relate to material chosen. e.g. woodturning – preparing blank, holding work, setting rests, tools used, turning outside, turning inside, parting, etc. (1 × 9) [9]
- (ii) Drilling – method of holding round shape for drilling, round former, support, protection, vice, etc. (1 × 4) [4]

(c) Any suitable material that gives colour such acrylic, silver, teak, glass, etc. Method of bonding may be a named adhesive, solder, cold, heat, etc. (1 × 2) [2]