UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

MARK SCHEME for the October/November 2009 question paper for the guidance of teachers

6043 DESIGN AND TECHNOLOGY

6043/01 Paper 1 (Technology), maximum raw mark 95

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Part A – All questions to be answered.

1 Any of the following simple tests cutting, heating, smell, scratch, flame colour, etc. (1 × 2) [2]

2 **(a)** Tool maker's clamp = 1.

(b) Parallel grip for holding small pieces together for assembling, riveting or screwing. (1 × 2) [2]

3 Knock down fittings – used on manufactured boards such as chipboard, blockboard, that make up modern furniture. Flat pack and self assembly. (1 × 2) [2]

4 Two reasons from lightweight, absorbs shocks, heat insulator, sound insulator. (1 × 2) [2]

5 **Processes**

(a) Laminating – shape built up with layers of material bonded together.

(b) Blow moulding – shape created by blowing compressed air onto a softened plastic surface.

(c) Shape is formed by pouring a molten material into a hollow mould. (1 × 3) [3]

6 Sketch of

(a) Hexagonal bolt.

(b) Butt hinge. (2 × 2) [4]

7 **(a)** Name – such as coping, fret, vibro, etc. with reason small thin blade which can cut round corners.

(b) Stop splitting by fixing paper or tape on reverse side of plywood. (2 × 2) [4]

8 Two reasons from – wide range of colours, hard, strong, heat and stain resistant, hygienic, etc. (1 × 2) [2]

9 Three wood adhesives from – scotch, casein, synthetic resin, PVA, resorcinol, epoxy, etc. (1 × 3) [3]

10 Swarf is the sharp metal waste material that is produced when drilling or cutting on a machine such as the lathe. It can cut a person's hand if touched, etc. (1 × 3) [3]

Part B

11 (a) Three tools identified and use stated.
A – **Tin Snips (straight)** – cutting thin sheet metal or plastic
B – **Pincers** – pulling out nails from wood
C – **Combination pliers** – used to grip small items (2 × 3) [6]

(b) (i) It is limited in that it can only cut straight lines and thin sheets of metal.

(ii) The jaws of the tool grip the nail just under its head, the rounded outside shape of the tool is now rolled over with the long handles so giving good leverage.

(iii) The tool can grip both flat and round material, it can also cut thin wire, and shear thicker wire. (2 × 3) [6]

(c) (i) Sketch of forge tongs, these may be any type.

(ii) Sketch of tap wrench. (1 × 3 for sketches plus 2 for purpose = 5) [5]

12 (a) **Purpose** – to remove scratches or marks and give a smooth surface. (1 × 2) [2]

(b) (i) glasspaper, garnet paper, etc.

(ii) emery cloth, water of Ayr stone, pumice powder, etc.

(iii) wet and dry paper, rubbing down compounds (e.g. Perspex No 2) (1 × 3) [3]

(c) Sketches showing the following –

(i) an abrasive paper wrapped around a file blade, rubbing a piece of work held in a vice or on a block.

(ii) an abrasive paper wrapped around a wooden block and rubbing a work piece in one direction. (2 × 3) [6]

(d) Sketch showing the

(i) use of a chisel blade on an oil stone, being rubbed forward and back (sharpening).

(ii) use of screwdriver on a grindstone, angle setting (grinding). (2 × 3) [6]

13 (a) **Specific** material and **one** reason.

(i) **Metal** – such as brass, copper, aluminium, silver, etc. – good colour, do not rust, quite easy to work, polish well.

(ii) **Plastic** – acrylic, nylon, polythene, etc. – wide range of colours, easily cleaned, durable, etc.

(iii) **Wood** – pine, teak, mahogany, etc. – nice range of colours, easy to join, durable, lightweight, etc. (2 × 3) [6]

(b) Names and sketches of tools and materials used to

(i) Join the three pieces together – must relate to the materials chosen e.g. beech and mahogany – adhesive named and clamping tool sketched.

(ii) Method of holding work and tool used to drill the finger hole. Could be machine vice and tank cutter, etc.

(iii) Method of holding and tools used for cutting the outside shape. Could be bench vice and coping saw, band saw, etc. (3 × 3 + 2 for extra detail = 11) [11]

14 (a) Material named and reason given – such as aluminium – can be cast to shape, lightweight, easy to work, etc. (1 × 2) [2]

(b) Processes described (must relate to material in **(a)**), the material could be wood, metal or plastic. Must involve tools, equipment, stages in the process. (1 × 8) [8]

(c) Sketch of the design that could be applied to the peg – could be a figure or pattern, etc. (1 × 2) [2]

(d) Design applied to surface explained – may be inlay, paint, transfer, etc. Details of tools, method, etc. (1 × 5) [5]

15 Notes and sketches on **two** of the following –

(a) mild steel bars cleaned, fluxed, area fluxed, soft iron, wired, brazing hearth, brazing torch, spelter, types, heating, temp, cooling, etc.

(b) cutting the tail first, holding, dovetail saw, angles, straight cuts, marking for second piece, holding upright in vice, cutting verticals, coping saw, removing centre waste, trimming with chisel, fitting.

(c) cleaning, heating base, oven or strip heater, former, bending, masking, joining area, tensol, application, holding, etc. (1 × 8 × 2 +1 for outstanding detail) [17]

16 (a) Any suitable material that can provide the strength at this section e.g. beech. Joining must be moveable – e.g. rivet, screw, etc. (1 × 2) [2]

(b) (i) Marking out the arms – must relate to chosen material e.g. wood-pencil, ruler, try square, gauge, dividers, etc.

(ii) Cutting to shape – holding method, cutting, saw, shaping tools, etc. (1 × 4 × 2) [8]

(c) Notes and sketches describing fitting pegs to rack – must be some form of countersunk rivet system, drilling, countersinking, peg shape with a shoulder, spacer between arms, holding, riveting. (1 × 7) [7]

17 (a) (i) May be machine sanding timber, in GRP work handling glass matting and resin, working hot metal, plastic, acid bath cleaning, etc. Skin reaction, burns, cuts, diseases, dermatitis.

(ii) May be turning on the lathe, drilling, grinding, sanding, chemicals, liquids, etc. Dust, grit, waste particles, etc.

(iii) May be sanding, cutting plastics, painting, etc. Fumes, dust, etc. (2 × 3) [6]

(b) (i) Before starting work – apply barrier cream to hands, wear the correct gloves, disposable, rubber, leather, etc.

(ii) Wear the correct eye protection, goggles, safety glasses, face shield, etc. Use safety guards on machines.

(iii) Good ventilation, extractor fans, face masks, etc. (2 × 3) [6]

(d) Personal clothing, appearance and behaviour – loose clothing, ties, sleeves, cuffs. Watches, and other decorative items. Long hair can get caught in revolving parts or machines, soft shoes/trainers can lead to broken toes if heavy tools are dropped onto them. Fooling about can lead to dangerous situations. (1 × 5) [5]

18 (a) Notes and sketches showing the processes – (1 mark for each material)

(i) Supporting and cutting the holes – the work can't be done on a drilling machine. Working as a pair, supporting, waste material, clamping, tools, action. [5]

(ii) Spacing and positioning bars, holding, drilling or marking for fixing, method of fixing, nails, screws, tools, etc. [5]

(iii) Construction of support legs, built up, joints, welding, adhesives, fixings, etc. [5]

(b) Sketch of a release system – could be a hinged bottom bar with a quick release catch, pin release bottom bar, etc. [2]