Cambridge
O Level

Cambridge Assessment International Education
Cambridge Ordinary Level

DESIGN AND TECHNOLOGY **6043/01**

Paper 1 **October/November 2017**

MARK SCHEME

Maximum Mark: 100

Published

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.

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Part A

Attempt <u>all</u> questions.

Question	Answer	Marks
1(a)	forstner bit, flat bit,drill, hole saw	**1**
1(b)	coping saw. Jigsaw, reciprocating saw	**1**
1(c)	dividers, compass	**1**
1(d)	centre punch, (masking tape)	**1**
1(e)	template	**1**
1(f)	marker pen, chinagraph pencil	**1**

Question	Answer	Marks
2(a)	bench hook	**1**
2(b)	holding work still to saw accurately	**1**

Question	Answer	Marks
3(a)	clear sketch of sash cramp up to 2	**2**
3(b)	clear sketch of bradawl up to 2	**2**

Question	Answer	Marks
4	beech does not splinter easily, takes a smooth finish, tough, takes knocks **1** · **2**	**2**

Question	Answer	Marks
5	tempering – heat treatment process **1** to increase toughness **1** (reduces hardness)	**2**

Question	Answer	Marks
6(a)	Glass Reinforced Plastic (Polyester)	**1**
6(b)	vehicle body, kayak	**1**

Question	Answer	Marks
7	micrometer, Vernier calliper, (calliper and rule) **1 · 2**	**2**

Question	Answer	Marks
8	plastic cup – expanded polystyrene **1**	**3**
	garden bench – teak, iroko, cedar, any other appropriate **1**	
	saucepan – aluminium alloy, stainless steel (copper) **1**	

Question	Answer	Marks
9	tie hair back, wear goggles , secure work, any other appropriate **1 · 2**	**2**

Question	Answer	Marks
10	brass **1** copper **1** zinc **1** bronze **1** copper **1** tin **1** steel, **1** iron **1** carbon **1**	**3**

Part B

Attempt <u>four questions</u>, <u>two</u> from Section 1 and <u>two</u> from Section 2.

Section 1 – Tools and Materials

Question	Answer	Marks
11(a)	Three tools identified and use stated A – **Jack plane** (accept smoothing or plane) – preparing flat surface on wood B – **spokeshave** – preparing curved shapes in wood C – **rasp –** shaping wood or foamed/expanded plastic **2** · 3	**6**
11(b)(i)	vertical adjustment by hand nut, lateral adjustment by lever**,** good description **2**	**6**
11(b)(ii)	blade depth set by two adjusting screws **1** adjust each screw to ensure even depth **1**	
11(b)(iii)	slicing, single cut action, good finish in **A 1**– multiple 'teeth' cuts **C**, not as good a finish with **C 1**	
11(c)(i)	sketch of countersink bit – cutting csk for screw-heads up to **3**	**6**
11(c)(ii)	sketch of tap wrench, purpose – turning tap to cut a thread up to **3**	

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>12</td><td>
<table>
<tr><th>Material</th><th>Application</th><th>Properties</th></tr>
<tr><td>Medium Density Fibreboard</td><td>Large furniture – wardrobes, table tops</td><td>Large surfaces available, smooth finish, dimensionally stable,
Can be veneered, painted</td></tr>
<tr><td>Phenol formaldehyde</td><td>Electrical fittings, door handles, irons, saucepan handle</td><td>Heat resistant, usually dark products, stiff, hard material, can be used in laminates</td></tr>
<tr><td>Duralumin</td><td>Aircraft and vehicle parts</td><td>Ductile, malleable, corrosion resistant, lightweight</td></tr>
<tr><td>Acrylic</td><td>Shop signs, baths, rear light units on cars
(school based projects)</td><td>Good optical qualities, variety of colours, better impact resistance than glass but scratches easily</td></tr>
<tr><td>Plywood</td><td>Thin ply used for laminated shapes, flooring, construction</td><td>Large surfaces available, cross grain effect very strong dimensionally stable,
with water resistant adhesive can be used outdoors</td></tr>
<tr><td>Copper</td><td>Water pipes, electric cable, car radiators</td><td>Malleable, ductile, very good conductivity, heat and electrical</td></tr>
</table>
1 for application, 2 for property/ function with link to application
(1 · 6 + 2 · 6)
</td><td>18</td></tr>
</table>

Question	Answer	Marks
13(a)(i)	Hardwoods Softwoods both for **1** Ferrous Non-ferrous both for **1** Thermoplastic thermosetting plastic both for **1**	**3**
13(a)(ii)	appropriate hardwood and softwood **2** appropriate Ferrous and non-ferrous **2** appropriate Thermoplastic and thermosetting plastic **2**	**6**
13(b)	explanation should include: Material example e.g. specific hardwood , MDF, acrylic, specific metal **1,** Hazard – dust inhalation , sharp edge , **1** Accept any other specific safety risks Precaution – masks, extractors, remove sharp edges, use gloves **1**	**3**
13(c)(i)	explanation should include: product **1** Availability, recyclability, obtaining/processing materials up to **2**	**3**

Question	Answer	Marks
13(c)(ii)	explanation should include: product **1** function, safety, appearance, market appeal up to **2**	**3**

Question	Answer	Marks
14(a)(i)	die (die holder)	**1**
14(a)(ii)	forstner bit, (flat bit, small point)	**1**
14(a)(iii)	coping saw, (abrafile), hegner saw	**1**
14(b)(i)	guillotine, shears/tinsnips, fine blade hack saw	**12**
14(b)(ii)	fine tooth saw, dovetail/tenon with guide, (fine blade coping saw with guide), band saw	
14(b)(iii)	tenon saw with guide. Jigsaw, band saw Good communication **1**, details of tools, holding work whilst cutting up to **3** **3 · 4**	
14(c)	explanation could include: sharpness, quality finish, speed / ease of use, safety implications – up to **3**	**3**

Section 2 – Processes

Question	Answer	Marks
15(a)	Material could be – nylon, aluminium, brass, appropriate hardwood (birch/beech) **1** Reasons could be, easy to turn, takes a good finish, aesthetically pleasing. **1** · 2	**3**
15(b)(i)	appropriate turning process including details of tools up to **5**	**15**
15(b)(ii)	appropriate application of quality control/measurement up to **5**	
15(b)(iii)	appropriate method of achieving smooth finish up to **5**	

Question	Answer	Marks
16	any **two** processes	**18**
16(a)	**hollowing** – cutting disc – tinsnips – annealing – – bossing mallet/hammer – leather sand bag – hammer – hollow wooden block, blocking hammer – final planishing/finish most stages **9**	
16(b)	**injection moulding** – split mould prepared – plastic granules fall from hopper into heating chamber – archimedes screw injects into mould – remove and trim most stages **9**	
16(c)	**steam bending** – prepare bending jig – steam strips in chamber until pliable – hold in bending jig – remove and trim to shape most stages **9** 2 · **9**	

Question	Answer	Marks
17(a)	suitable materials **handle** – aluminium, stainless steel, brass, (acrylic) nylon rod **base** – named hardwood, aluminium, copper acrylic, polystyrene	
17(a)(i)	processes could be –vacuum formed, pressed, turned Material **1** process **4**	**5**
17(a)(ii)	processes could be – shaping using heat/jig Material **1** process **4**	**5**
17(a)(iii)	joining process could be – riveting, , using threads, drilling and cementing Material **1** process **4**	**5**
17(b)	appropriate modification	**3**

Question	Answer	Marks
18(a)(i)	mark out using sliding bevel, engineers blue engineers square, scriber Saw/file to shape Flux and braze Clean up most stages **6**	**12**
18(a)(ii)	prepare former Cut veneer/thin ply to shape Glue and alternate grain Clamp up/vacuum bag Remove trim to shape/finish most stages **6**	
18(a)(iii)	cut length of rectangular section nylon Mill (saw and file) shoulders File rounded shape Finish Or injection moulded Create two part mould Heat plastic granules, preheat mould Inject plastic Water cool mould Eject part/remove sprue most stages **6** Accept other appropriate processes 2 · **6**	
18(b)	appropriate method of securely attaching the seat most stages **6**	**6**