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**DESIGN AND TECHNOLOGY**

**0445/32**

Paper 3 Resistant Materials

**October/November 2017**

MARK SCHEME

Maximum Mark: 50

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**Published**

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This document consists of **6** printed pages.

## Section A

Question	Answer	Marks
1	Award 0–2 dependent on technical accuracy Top and bottom plies =1 Strips shown correctly =1 Blocks drawn on 2 edges =0	2

Question	Answer	Marks
2(a)	cast iron.	1
2(b)	hard, hardwood, hardwearing. <b>Not</b> durable	1

Question	Answer	Marks
3	temperature	1

Question	Answer	Marks
4(a)	injection moulding, blow moulding	1
4(b)	mild steel will rust when in contact with water galvanising mild steel prevents rusting	1 1
4(c)(i)	A	1
4(c)(ii)	injection moulding is a quick process, fewer processes, mould can be reused, whereas <b>B</b> would require fabrication of parts taking longer to make and involve more material	1

Question	Answer	Marks
5	Award 0–2 dependent on technical accuracy. 2 curved legs = 2 with points = 1 only	2

Question	Answer	Marks
6	<b>Joining acrylic</b> Danger – flammable, toxic fumes, irritant to skin Prevention – ventilation, wear gloves, barrier cream, mask [any form accepted]	1 1
	<b>Pouring molten aluminium</b> Danger – ‘spitting’ of hot metal, spillages Prevention – wear visor, gauntlets, leather apron, overshoes	1 1
	Must be <b>specific</b> equipment	

Question	Answer	Marks
7	A diameter/gauge of thread B length/height of screw C type of head/countersink head. <b>Not</b> type of screw	1 1 1
		<b>3</b>

Question	Answer	Marks
8	Award 0–2 dependent on technical accuracy Tongue = 1 Groove = 1 Award 1 mark for separate tongue	
		<b>2</b>

Question	Answer	Marks
9(a)	to dry out wood, remove moisture, to minimise shrinkage/warping/rotting Minimise attack from woodboring insects	
		<b>1</b>
9(b)	kiln, artificial	
		<b>1</b>

Question	Answer	Marks
10	phenol formaldehyde nylon	1 1
		<b>2</b>

## Section B

Question	Answer	Marks	
11(a)	The types of [suitable] outdoor materials and finishes,, constructions, appropriate dimensions to consider, the sizes of car 'boots', space saving devices to make the table compact 3 × 1	3	
11(b)(i)	mild steel, aluminium	1	
11(b)(ii)	two heat processes: soldering <b>or</b> brazing, welding Aluminium: award 1 mark only for welding. Award 2 marks for 2 different types of welding. 2 × 1	2	
11(c)	Plastic laminate: heatproof, stainproof, waterproof, attractive, easier to clean. 2 × 1	2	
11(d)(i)	<b>Some form of hinge or pivot method</b> Use of hinge or similar method shown without description Clear sketch [and name if appropriate]  <b>Details of materials, fittings and constructions</b> Named material/s Fittings/constructions: e.g. award 1 mark for stating screws, named, braze	<b>0–2</b> 1 2  <b>0–2</b> 1 1	4
11(d)(ii)	<b>Some form of 'catch'/bracket to support end frames</b> Accurate sketch showing method clearly  <b>Materials</b> named <b>Fittings and constructions</b> named	<b>0–2</b> 2  1 1	4
11(e)	<b>Method to remain level</b> some form of adjustment to legs/'telescopic' principle method of locking/securing details of rods, pins, screws, nuts and bolts  <b>Details of materials, fittings and constructions</b> e.g. length of rod/pin, types of head of screw, named materials	<b>0–3</b> 1 1 1  <b>0–2</b>	5

Question	Answer	Marks	
12(a)(i)	Sliding bevel evident in sketch Correct position of sliding bevel	0–1 0–1	2
12(a)(ii)	Wide variety of saws: tenon, coping, jig, band, Hegner or equivalent		1
12(a)(iii)	Jack, smoothing plane, block		1
12(b)(i)	Nail: round wire, round, oval, panel pin		1
12(b)(ii)	Outdoor adhesive: PVA, Cascamite. Accept any appropriate trade names <b>Not</b> superglue or Araldite [epoxy resin] Time to set must correspond with named adhesive	1 1	2

Question	Answer	Marks
12(c)	Suitable hinge: butt or piano Award 0–3 dependent on technical accuracy of sketch of hinge Correctly named	0–3 1 <b>4</b>
12(d)(i)	acrylic held securely in vice or clamped to bench use of coping saw, Hegner saw or equivalent, band saw use of files to make flat and smooth	1 1 1 <b>3</b>
12(d)(ii)	acrylic window fitted by means of grooves or applied beads Award 0–2 dependent on technical accuracy  Constructional details: tools used, sizes, processes involved	0–2  0–2 <b>4</b>
12(e)	Method of attachment: some form of screw thread and nut to fasten parts together Award 0–3 dependent on technical accuracy Award max. 0–2 for simple bend dependent on added notes Award 1 mark for simple 'stop' Award 1 mark for details of 'stop': e.g. method of fixing to rod Award 1 mark for details of materials	<b>3</b>
12(f)	Problems include: climate [heat, cold, wet, wind], theft, vandalism  Solutions include: weather resistant materials, protective finishes, secure mounting of products and 'vandal proof'/tough/durable materials  Award 1 mark for any sensible problem identified and award 1 mark for any practical solution.	<b>4</b>        4 × 1

Question	Answer	Marks
13(a)	MDF is more stable, cheaper, readily available, larger sheets, easier to cut/work <b>Not</b> lighter in weight	2 × 1 <b>2</b>
13(b)(i)	Quicker, easier, accurate, repetitive accuracy	<b>1</b>
13(b)(ii)	Coping, band, jig, Hegner or equivalent	<b>1</b>
13(b)(iii)	Half-round file, round/rat tail file. <b>Must</b> be specific name	<b>1</b>
13(c)(i)	positions drawn along centre of thickness accept holes drawn in appropriate position positions for centres 20–50 mm <b>in</b> from each edge dimensions noted on drawing	1  1 1 <b>3</b>
13(c)(ii)	Ø6 or Ø9 dowel	<b>1</b>
13(c)(iii)	chamfer: to help guide the dowel into the hole Grooves: to provide space for the glue	1 1 <b>2</b>

Question	Answer	Marks	
13(c)(iv)	template + 2 inaccurately drawn holes shown template + 2 accurate holes shown template + 2 accurate holes shown with location in <b>one</b> direction template + 2 accurate holes shown with location in <b>two</b> directions	1 2 3 4	<b>4</b>
13(c)(v)	Quality of explanation of use	0–2	<b>2</b>
13(d)	Use of drill to drill out one or more holes Use of piercing saw or Hegner [with metal cutting blade] to cut out Use of files to achieve shape Correctly named tools	1 1 1 1	<b>4</b>
13(e)	MDF is unattractive without some form of opaque 'covering'. Paint used can be colourful and vibrant Clear varnish would not hide the unattractive surface	1 1	<b>2</b>
13(f)	Self-assembly products popular: Can be collected and transported immediately, self-satisfaction of assembling correctly, wide range of purpose built products, good value for money/generally cheaper than some ready-assembled products	2 × 1	<b>2</b>