OCR
RECOGNISING ACHIEVEMENT

GCSE

Design and Technology: Resistant Materials

General Certificate of Secondary Education

Unit **A564:** Technical aspects of designing and making

Mark Scheme for June 2011

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Section A

<table>
<tr><th colspan="3">Question</th><th>Expected Answers</th><th>Marks</th><th>Rationale</th></tr>
<tr><td>1</td><td>(a)</td><td></td><td>
<table>
<tr><th>Stage</th><th>Process</th><th>Tools</th></tr>
<tr><td>1</td><td>Mark out the slot</td><td>Rule, pencil, try square, sliding bevel, marking/mortice gauge, knife</td></tr>
<tr><td>2</td><td>Cut out the slot</td><td>Saw, chisel, mallet</td></tr>
<tr><td>3</td><td>Make the bottom of the slot flat</td><td>Chisel, file, glass/sand paper</td></tr>
</table>
</td><td>[3]</td><td>Candidates may name several tools for each stage. Award 1 mark for any one correct tool.
Stage 1
Not marker pen, chinagraph pencil or scriber
Stage 2
Award 1 mark for any answer including the word saw, even if the type of saw is inappropriate. Do not allow hammer</td></tr>
<tr><td></td><td>(b)</td><td></td><td>Heated up using strip heater/line bender, oven [1]
Bend around a jig/former/rod [1]
Additional detail of process [1]</td><td>[3]</td><td>Allow the word ‘melt’ for heating.

Additional details could include marking out, bending/holding plastic</td></tr>
<tr><td></td><td>(c)</td><td></td><td>Processes include: file/filing, scraping, wet and dry paper, silicone carbide, buffing, buffer, polishing mop/machine, compound/wax, polish/T cut, use of a flame applied to the edge [2x1]</td><td>[2]</td><td>Accept any two processes. Sequence not relevant.
Accept reference to laser cutter not requiring a finishing process,
Use of 2 grades of wet and dry allow 2 marks.
Do not allow sander, glasspaper but do allow ‘wet and dry sand/glasspaper’</td></tr>
<tr><td></td><td>(d)</td><td></td><td>Modification includes integral base: current design inverted and base extended or separate base cemented on.
Practical idea: stable base. [0-2]
Details of manufacture include: bending, joining. [0-2]</td><td>[4]</td><td>Look for a sensible idea that will work.
Look for innovative integral designs requiring no additional material and designs including the cementing of extra pieces of acrylic.
Do not accept any similar feet to those shown in Fig.1.</td></tr>
<tr><td></td><td></td><td></td><td>Total</td><td>[12]</td><td></td></tr>
</table>

Question			Expected Answers	Marks	Rationale
2	(a)		Self-finished means that metal has no applied finish. Can be polished to produce attractive finish. Does not rust/corrode Forms a protective oxide on the surface	[1]	**Do not** accept does not rot/erode, is already shiny.
	(b)		Rod held securely. [1] Method of producing bend using a former/jig/hole in bench/anvil. [1] Additional details of process [1]	[3]	Do not allow marks for reference to heating the rod, unless used to anneal the rod. Additional details could include appropriate method of applying force accept applying force by hand
	(c)		Some sort of block/bracket/plate to which rod is attached. [1] Aluminium rod secured to the block/bracket/plate [1] Block/bracket/plate capable of fixing to wall. [1] Details of materials / fittings used. [1]	[4]	Could include sizes/constructional details
	(d)		Harder than aluminium, will not bend in use, stronger, more durable, will not scratch as easily. [2x1]	[2]	Answers must relate to comparisons between stainless steel and aluminium, e.g. 'does not rust' is not acceptable **Do not** allow 'more aesthetically pleasing'
	(e)		Reasons include: space saving, out of the way, will not get knocked over, easier to use, will not move in use. [2x1]	[2]	Do not accept comments related to aesthetics
			Total	[12]	

Question			Expected Answers	Marks	Rationale
3	(a)		Advantages include: no grain direction, more stable, less likely to shrink warp or twist, greater structural strength, stronger, available in wide boards, more readily available.	[1]	**Do not** accept lighter, more durable. **Do not** accept references to sustainability or environmental issues
	(b)		Method of joining includes use of a bracket/block with corresponding fitting into which a pin or similar can be inserted to allow for steering. Method of attaching the frame to the column. Aiiow marks for a secure fixing that will not allow any movement of the column. Use of screws only to attach column to frame = 1mark Use of screws and glued block = 2 marks Use of knock-down fitting 1 mark [0-2] Method of achieving steering movement. [0-2] Named tools. [1]	[5]	Look for the technical accuracy of the fittings in position. Clear sketch showing how the 2 parts are assembled. Use of Hinge = 1 mark for attaching frame to the column and 1 mark for steering movement. Named tools: self-assembly means minimal specialist tools required: eg. screwdriver, adjustable spanner.
	(c*)		CAD drawings include: exploded views, assembly drawings, flow chart, separate drawings of each part. **Level 1 (0-2 marks)** Limited explanation of how CAD could be used to produce a set of instructions to enable customers to assemble the sit-on toy. There will be little or no use of specialist terms. Answers may be ambiguous or disorganized. Errors of grammar, punctuation and spelling may be intrusive. **Level 2 (3-4 marks)** Shows some understanding in the explanation given of how CAD could be used to produce a set of instructions to enable customers to assemble the sit-on toy. There will be some use of specialist terms although these may not always be used appropriately.		When marking 'Levels of response' questions if answers are presented as a list of bullet points then award Level 1 maximum and specific mark 0, 1 or 2 dependent on quality of list. Do not apply ticks or annotations to 'Levels of response' questions. Mark these by reading all the answer, decide on an appropriate level then a specific mark.

Question			Expected Answers	Marks	Rationale
			The information will be presented for the most part in a structured format. There may be occasional errors in spelling, punctuation and grammar. **Level 3 (5-6 marks)** Provides a detailed explanation of how CAD could be used to produce a set of instructions to enable customers to assemble the sit-on toy. Specialist terms will be used appropriately and correctly. The information will be presented in a structured format. The candidate can demonstrate the accurate use of spelling, punctuation and grammar.	**[6]**	
			Total	**[12]**	

Section B

Question			Expected Answers	Marks	Rationale
4	(a)	(i)	**Quality control checks carried out DURING manufacture could include:-** Quality control checks include: length of wood cut before assembly, quality of joint after gluing, check for squareness when assembled and glued, visual check on completion, check for splinters.	**[1]**	During manufacture means from the start of production to completion of the bracket Accept testing of bracket using shelf with books or weights
		(ii)	Description of **how** includes: Length of wood would be measured, strength of joint by random test to destruction, squareness by diagonal measurement or try square/template, add weights to the bracket	**[1]**	**DO NOT PENALISE CANDIDATES IN PARTS (II) AND (III) IF (I) IS INCORRECT.** Answer **must** relate to response in part (i)
		(iii)	Stages include: lengths of wood checked before assembly, strength of joint after glued and dried, check for squareness can be when assembling or at completion, visual check for defects at completion.	**[1]**	Answer **must** relate to response in part (i)
	(b)		Modifications should: Secure the shelf – side to side 1 mark back to front 1 mark up and down 1 mark	**[3]**	Must **not** use screws or dowels or metal pegs or modification to shelf.
	(c*)		Analyses includes following issues: Fabrication [making joints] can take longer because of increased number of processes. Fabrication requires a series of jigs to speed up production. Moulding [injection moulding] is expensive to set up initial tooling and requires large quantity production to be cost effective. Once set up injection moulding is much quicker than wood fabrication. **Level 1 (0-2 marks)** Provides limited comparison of the manufacturing methods of both brackets to determine which is the more efficient to produce in quantity. There will be little or no use of specialist terms. Answers may be ambiguous or disorganized. Errors of grammar, punctuation and spelling may be intrusive.		Candidates must demonstrate basic knowledge of fabrication [making joints] **and** moulding [injection moulding] and provide a decision for maximum marks. Candidates can argue for either the wooden **or** the plastic bracket. When marking 'Levels of response' questions if answers are presented as a list of bullet points then award Level 1 maximum and specific mark 0, 1 or 2 dependent on quality of list.

Question			Expected Answers	Marks	Rationale
			Level 2 (3-4 marks) Shows some understanding of the issues involved when comparing the manufacturing methods of both brackets to determine which is the more efficient to produce in quantity. There will be some use of specialist terms although these may not always be used appropriately. The information will be presented for the most part in a structured format. There may be occasional errors in spelling, punctuation and grammar. **Level 3 (5-6 marks)** Shows detailed understanding when comparing the manufacturing methods of both brackets to determine which is the more efficient to produce in quantity. Specialist terms will be used appropriately and correctly. The information will be presented in a structured format. The candidate can demonstrate the accurate use of spelling, punctuation and grammar.	**[6]**	Do not apply ticks or annotations to 'Levels of response' questions. Mark these by reading all the answer, decide on an appropriate level then a specific mark.
			Total	**12**	

Question			Expected Answers	Marks	Rationale
5	(a)		Advantages of polypropylene over wood-based material include:- more hygienic, easier to keep clean, doesn't stain easily, moulded shape, more comfortable, less maintenance, attractive inherent colour, no finish needed, resists moisture, lighter weight, could have a textured/non-slip finish, easier to manufacture in quantity, doesn't dent as easily. [2x1]	**[2]**	Do not accept heat resistant unless qualified. Do not accept smoother, recyclable, stronger, more durable.
	(b)		Height adjustment 1 mark Some form of fastening/locking device 1 mark Additional details to adjustment and/or locking device. 2 marks	**[4]**	Modification to allow height adjustment which could include use of 2 different diameter of steel tubes Use of pins/pegs/screw threads/spring loaded push buttons/nuts and bolts Must include at least 2 of the following – sizes, materials, construction, ease of use, for maximum 2 marks
	(c)		Method of locking in horizontal position: some form of 'stay' between the top and the tube quality of design idea 0 – 2 marks Details of solution 1 mark Some form of 'hinge' to allow for folding :- quality of design idea 0 – 2 marks Details of solution 1 mark	**[6]**	Could include the following technical details:- sizes, materials, construction, ease of use If hinge labelled with no details 1 mark max Could include the following technical details:- sizes, materials, construction, ease of use
			Total	**[12]**	

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