

Design and Technology: Resistant Materials

General Certificate of Secondary Education

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

Mark Scheme for June 2012

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All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

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Question		Answer	Marks	Guidance
1	(a)	Can be bent easily, thermoplastic, can be shaped easily, attractive, looks good, can be coloured, supports weight of headphones, can be made rigid, easily assembled, can be polished.	1	Do not accept lightweight, durable. Only accept 'strong' if qualified
	(b)	Scriber leaves a mark. A scribe is used on metal Can make the material weaker. Will affect the appearance Will damage the acrylic	1	
	(c)	It would be awkward to finish the edges after bending to shape, quicker, more efficient, reduces the risk of breaking the acrylic.	1	
	(d)	Models: help visualise final product, can carry out evaluation and changes, cheaper than using acrylic, check stability, check/work out sizes, to see if it works, to avoid wasting acrylic, to use as a template, to present to potential clients. [2x1]	2	
	(e)	Reference to personal safety, Specific danger noted, eg irritant to skin, toxic fumes, How danger can be minimised/prevented 'Control of substances hazardous to health' stated	3	Award 1 for each specific danger noted
	(f)	Some form of bracket, rods, box, recessed back, added base or other relevant solution. [0-2] Practical solution. [0-2] Details of materials, sizes, constructions.	4	TAKE CARE - candidate may have drawn the solution on Fig 1 (see question 1a) Look for any two of materials, sizes, constructions for 2 marks.

Question		Answer	Marks	Guidance
2	(a)	Ductile, tough, malleable, durable, easily welded, brazed, assembled, can be painted/plated/plastic coated, readily available, can be recycled, easy to work with, available in a variety of shapes/sections.	1	Do not accept – strength, cost, lightweight, appearance
	(b)	Accept any 2 from: makes a small indentation to guide the drill cleaner hole prevents drill from ‘wandering’ safer due to indentation, Improves accuracy of drilling. [2x1]	2	Do not accept to show position of hole
	(c)	Accept any 4 from: clean with file/emery cloth attach/wire/clamp pieces together arrange firebricks to reflect heat position on hearth apply flux to joint light brazing/welding torch adjust flame apply heat apply spelter/brazing rod wait for spelter to run leave to cool [4x1]	4	Sequence not essential. Reward individual relevant stages in process: eg heat brazing rod and dip in flux. Accept use of oxy-acetylene. Do not accept cleaning up after brazing Do not accept welding joint
	(d)	Hole for pivot in plate and leg [1] Pin inserted through hole [1] Pin has head to prevent being pulled through hole [1] Method of tightening/securing [0-2]	5	Appropriate use of hinge as a pivot = 3 marks Nut and bolt/screw 1 Wing nut or knurled fastening 2 Cam 2 Use of pin/peg/brace to restrict movement 0-2 depending on position

Question		Answer	Marks	Guidance
3	(a)	Sketch [0-2] Additional notes [0-1]	3	Accept any view of top and side: eg end view or 3D. Accept sketch of one KD fitting for maximum marks. Can be wooden block- does not have to be a pre-manufactured KD fitting. Notes must add information to the sketch. Dowel - maximum 1 mark Do NOT accept screws
	(b)	Accurate sketch of pre-manufactured component runner award 2 marks. OR Use of grooves [cut or applied] clearly drawn Sketch [depending on technical accuracy] [0-2] Additional notes [0-1]	3	Notes must add information to the sketch.

Question		Answer	Marks	Guidance	
				Content	Levels of response
	(c*)	<p>Explanation of why the computer table could be considered to have a 'limited product lifetime' includes the following issues:</p> <p style="text-align: center;"><u>Issues</u></p> <p>Materials such as manufactured board may not be as long lasting as solid wood.</p> <p>Constructions such as KD fittings dependent on strength of screw thread may not be considered long lasting. Over time, in use, KD fittings may become worn.</p> <p>Fashion can dictate the change for furniture of this type.</p> <p>Technological developments means that tables to accommodate computers etc may become obsolete.</p>	6	<p>Candidates can achieve maximum marks for a thorough explanation of <u>one</u> issue.</p> <p>Knowledge of composition of some manufactured boards is important.</p> <p>Knowledge of how some KD fittings work is important.</p> <p>Space in homes can be used for different purposes over time.</p> <p>Use of laptops and i pads reduce the need for this furniture.</p>	<p>Level 3 (5-6 marks)</p> <p>Gives a detailed explanation of why the computer table could be considered a product with a 'limited lifetime' and analyses most of the issues.</p> <p>Specialist terms will be used appropriately and correctly. The information will be presented in a structured format.</p> <p>The candidate can demonstrate the accurate use of spelling, punctuation and grammar.</p> <p>Level 2 (3-4 marks)</p> <p>Gives some explanation of why the computer table could be considered to have a 'limited product lifetime', with some analysis of the issues.</p> <p>There will be some use of specialist terms although these may not always be used appropriately.</p> <p>The information will be presented for the most part in a structured format.</p> <p>There may be occasional errors in spelling, punctuation and grammar.</p>

Question			Answer	Marks	Guidance
					<p>Identify the band that the answer fits best then decide on which of the two marks in that band.</p> <p>Level 1 (1-2 marks)</p> <p>Gives a limited explanation of why the computer table could be considered to have a 'limited product lifetime'. 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.</p> <p>0 marks No response worthy of credit.</p>

Question		Answer	Marks	Guidance
4	(a)	Accept any 2 from: cheaper than hardwood more readily available will not warp, shrink or split suitable to take a painted finish available in large sizes environmentally sustainable or equivalent [2x1]	2	Accept easier to machine only if qualified by named manufactured board: eg MDF but not blockboard or chipboard. Do not accept stronger, lighter, does not splinter
	(b)	Suitable joints include: dovetail, finger [comb], half-lapped, mitre, dowel. Award 1 mark for correct name. Award 0-2 marks dependent on clarity and accuracy of joint.	3	Reward sketch of butt joint if drawn with use of screws or pinned and glued with 2 marks and 0 marks for name of joint. Reward butt joint with pins but no glue as 1 mark. If named joint does not match an acceptable sketch award the higher mark
	(c)	Method for determining the length of domino: Lined up with edge or line only [1 max] Lined up against a 'stop' [2] Additional explanatory notes or relevant size (150mm) [1]	3	Must be a modification to the given bench hook

Question	Answer	Marks	Guidance
(d)	<p>Only accept <u>ONE</u> preliminary stage: design produced on CAD, design sent from computer to CAM machine</p> <p>Dots can be produced by vinyl cutter, CNC router/laser, robotic spray painting, engraver, lithographic/sublimation printing.</p> <p>Use of vinyl cutter: Explanation can include any 4 from: load vinyl into machine set machine parameters start to cut remove excess vinyl to leave dots apply tape to vinyl and peel off apply dots to dominoes repeat process for different colours</p> <p>Use of CNC router: secure material onto bed of machine select appropriate cutter set machine parameters paint indentations</p>	4	<p>Look carefully for any individual relevant stages in process. Reward up to 4 marks</p> <p>Named machine given only = 1 mark.</p> <p>If printing directly onto the dominoes, the specific printing process must be named eg lithographic/sublimation printing.</p> <p>CNC router answers must include reference to application of colour after machining the indentations for maximum marks.</p>

Question		Answer	Marks	Guidance
5	(a)	Saves on resources, better for the environment, cheaper than making new ones, quicker than making new ones, reduces global warming, carbon footprint, landfill.	1	Wide range of alternatives acceptable.
	(b)	Accept any sensible reference to the desk tidy that clearly shows an understanding of the term.	1	
	(c)	Some form of collar/spacer/bracket required onto which the tray will sit. [0-2] Details of how the collar/spacer is fixed to the column.[0-2]	4	Candidates can choose wooden dowel, plastic or metal rod or tube. Look for methods of joining appropriate to the chosen material.

Question		Answer	Marks	Guidance	
				Content	Levels of response
	(d*)	Explanation could include detailed understanding of moulding processes, including injection moulding, extrusion, blow moulding and vacuum forming. Benefits include: speed of production scale of production repetitive accuracy complex shapes possible low unit cost little or no waste recyclable materials Information about a variety of plastic products to illustrate.	6	High level answers should include detailed information about moulding processes and their benefits.	Level 3 (5-6 marks) Shows detailed understanding of the benefits of modern moulding processes used to manufacture plastic products and analyses most of the issues involved. 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.

Question			Answer	Marks	Guidance	
					Content	Levels of response
						<p>Level 2 (3-4 marks)</p> <p>Shows some understanding of the benefits of modern moulding processes used to manufacture plastic products, with some analysis of the issues involved. 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.</p> <p>Level 1 (1-2 marks)</p> <p>Provides limited explanation of the benefits of modern moulding processes used to manufacture plastic products. 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.</p> <p>0 marks No response worthy of credit.</p>
				Identify the band that the answer fits best then decide on which of the two marks in that band.		

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