

Design and Technology: Resistant Materials

General Certificate of Secondary Education

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

Mark Scheme for June 2013

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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)		<p>Description includes reference to: removal of waste – appropriate saw (1 mark)</p> <p>making smooth – planing, filing, sanding disc, linisher, belt sander, glass/sand paper (1 mark)</p>	2	<p>Accept any of the following saws - tenon, coping, band, scroll, jig or fret. DO NOT accept – chain, hack, circular saws.</p> <p>DO NOT accept – rasp, wet and dry paper</p> <p>Award 2 marks for an appropriate named CAM machines. DO NOT award laser cutter</p>
	(b)		<p>Stand with stable base [solid or legs]. Look carefully at proportions of length and width or diameter, dimensions are not required. 0–2 DO NOT accept concreted bases or wall mounted solutions.</p> <p>Method of joining sign to stand 0–2</p> <p>Named materials and other constructional detail. 0–2</p>	6	<p>3 separate features. Award 0–2 for each for technical accuracy and clarity.</p> <p>Marks can be awarded even if previous responses are inappropriate ditto</p>
	(c)		<p>Use of CAD software to design font, size etc.</p> <p>Use of named machine linked to computer.</p> <p>Transfer/sending of data from computer to machine.</p> <p>Set up material in machine, set tool parameters, start.</p>	4	<p>Look for any relevant detail that indicates a working knowledge of process using a CAD package to design followed by use of a vinyl cutter for applied lettering OR miller router OR laser to engrave letters.</p> <p>There could be more than 1 mark for each of the 4 features listed.</p>

Question		Answer	Marks	Guidance
2	(a)	Colourful or clear plastic available, can be shaped/moulded, easily worked, light/lightweight, self finished, easy to clean. 2x1	2	NOT – durable, cheap, strong
	(b)	Acrylic sheet can snag in drill bit Acrylic can spin Causes it to crack Possibility of injury Accurate location of holes 2x1	2	Accept any 2 points from those listed. Must state more than 'prevent it from moving'
	(c)	Vacuum forming Blow moulding/forming Injection moulding Press forming 2x1	2	
	(d)	Tensol or acrylic cement	1	
	(e)	Answers must refer to HOW the tools/equipment are used and NOT WHAT they are used for. Flat file – reference to cross/diagonal/draw filing Wet and dry paper – rub along edges (either wet or dry) Polishing mop – either using a polishing machine/buffing machine or polish applied using a hand mop	3	
	(f)	Use of cheap labour benefits manufacturers Competitive pricing benefits consumers Factories built close to market Economic benefits to specific areas of population Wider range of products available to consumer Factories set up near to raw materials to reduce transport costs and CO2 emissions 2x1	2	Accept any sensible benefit to consumers and/or manufacturers

Question			Answer	Marks	Guidance
3	(a)		<div> <div>tools/equipment</div> <div> <div>bench hook</div> <div>tenon saw</div> <div>smoothing plane</div> <div>glasspaper</div> </div> <div> <div>processes</div> <div> <div>make rough edges flat</div> <div>hold material for sawing</div> <div>make edges smooth</div> <div>cut material to size</div> </div> </div> </div>	3	
	(b)		<p>Cross halving, dowel or housing Cross halving with unequal slots Glued butt joint Modesty block/bracket</p> <p>max 3 marks max 2 marks max 2 marks max 1 marks</p>	3	<p>Can award maximum 3 marks without additional notes. Maximum marks must only be awarded if the answer is technically accurate and clearly communicated. Ignore any name given to the joint</p>

Question			Answer	Marks	Guidance	
					Content	Levels of response
	(c)		<p>Explanation, using examples, of importance of thorough research when designing products could include:</p> <ul style="list-style-type: none"> • name of a product • its function • essential information to find out • possible consequences if not carried out. 	6	<p>For example: in a DVD rack sizes and numbers of DVDs is essential, possible location, ergonomic requirements, specific user needs, possible maintenance, aesthetic considerations.</p> <p>If answers are presented as a list of bullet points then award Level 1 maximum and specific mark 1 or 2 dependent on quality of list.</p>	<p>Level 3 (5–6 marks) Detailed explanation, using examples, of importance of thorough research when designing products and analyses most of the issues. 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.</p> <p>Level 2 (3–4 marks) Some explanation, using examples, of importance of thorough research when designing products with some analysis of the issues. 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) Limited explanation, using examples, of importance of thorough research when designing products. There will be little or no use of specialist terms. Answers may be ambiguous or disorganized.</p>

Question			Answer	Marks	Guidance	
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					Identify the band that the answer fits best then decide on which of the two marks in that band.	Errors of grammar, punctuation and spelling may be intrusive. 0 marks = no response worthy of credit

Question		Answer	Marks	Guidance
4	(a)	Measure – rule, tape Mark out – scribe, pencil, marker/felt pen, permanent marker Cut to length – hacksaw, junior hacksaw	1 1 1	3 Accept 'scribe' for 'scriber'
	(b)	Attractive, corrosion resistant, low reactivity, does not rust, can be joined easily.	1	Do not accept durable, strong, malleable
	(c)	(i) Soldering, silver/hard soldering.	1	Do not accept brazing, soft soldering or welding
		(ii) Accept any sensible appropriate safety precaution related to a heat process . Use of gloves, visor/goggles/safety glasses, apron, spats, tongs, space around work area, hold work securely, remove any flammable products.	1	Do not accept PPE or wear protective clothing as these are too vague. Do not accept rubber gloves.
	(d)	Suitable joints include: finger [comb], half-lapped, mitre, dowel (accept a single dowel), corner halving, bridge, mortise and tenon, dovetail Award 1 mark for correct name. Award 0–2 marks dependent on clarity and accuracy of joint.	3	Sketch can be correct and name incorrect or sketch incorrect and name correct. Award highest mark For maximum marks sketches proportions must relate to sizes in fig. 5
	(e)	Modifications for ease of disassembly:- any 3 from Hardwood frame can be taken apart by using joints such as pins, pegs, screws Use of appropriate knock-down fittings - scan fitting/modesty block/brackets/corner plates Supports and hooks can be taken apart by using screw threads rather than soldered permanently When frame is dismantled the brass supports can be removed 3 x 1 mark	3	

Question		Answer	Marks	Guidance
5	(a)	<p>Award 0-2 marks for each specification point addressed in the candidate's design. Be careful not to reward the same information twice e.g. size of shapes under variety <u>and</u> safety</p> <p>Variety of shapes – At least 3 different shapes for children to handle. Look for size and way in which the shapes are used 0–2</p> <p>Hardwearing – Reference to materials used and their construction. Details of specific materials, not generic wood, metal, plastic. Reference to suitable constructions, processes, use of adhesive. 0–2</p> <p>Safe to use – Reference to non toxic materials, finishes, eased corners, edges, safe size of parts used. 0–2</p>	6	<p>Expect ONE design but candidates may show several sketches to communicate their ideas about construction, function etc.</p> <p>Do not expect complete details of how the toy would be made.</p> <p>Look carefully at candidate responses to each specification point and award appropriately.</p>

Question			Answer	Marks	Guidance	
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	(b)*		<p>Discussion of advantages to manufacturers and consumers of toys made from plastic rather than wood and/or metal includes:</p> <ul style="list-style-type: none"> • type of a toy made from wood and/or metal • recognised plastic toy • its function benefit to consumers • its manufacturing benefit to manufacturers. <p>Manufacturing processes generally will allow plastic products to be made more efficiently than fabricated techniques.</p> <p>Economies can be passed on to consumers.</p> <p>Plastic is more durable in many situations.</p> <p>Plastics products can be moulded into precise, complicated shapes.</p> <p>Plastics tend to be lighter than woods and metals.</p> <p>Plastics are self-finishing.</p> <p>Plastics have no electrical and little thermal conductivity.</p>	6	<p>For example: a model car made from metal now made from plastic.</p> <p>Benefit to consumer: more attractive appearance, lightweight material, more durable and corrosion resistant.</p> <p>Benefit to manufacturer: production methods enable faster production, lower costs after initial set up and therefore greater profits.</p> <p>For maximum marks answers must include at least one reference to both consumers and manufactures.</p> <p>If answers are presented as a list of bullet points then award Level 1 maximum and specific mark 1 or 2 dependent on quality of list.</p>	<p>Level 3 (5–6 marks) Detailed discussion of advantages to manufacturers and consumers of toys made from plastic rather than wood and/or metal. 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.</p> <p>Level 2 (3–4 marks) Some discussion of the advantages to manufacturers and consumers of toys made from plastic rather than wood and/or metal. 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) Limited discussion of advantages to manufacturers and consumers of toys made from plastic rather than wood and/or metal.. There will be little or no use of specialist</p>

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					Identify the band that the answer fits best then decide on which of the two marks in that band.	<p>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>

OCR (Oxford Cambridge and RSA Examinations)
1 Hills Road
Cambridge
CB1 2EU

OCR Customer Contact Centre

Education and Learning

Telephone: 01223 553998

Facsimile: 01223 552627

Email: general.qualifications@ocr.org.uk

www.ocr.org.uk

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Head office

Telephone: 01223 552552

Facsimile: 01223 552553

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