

Mark Scheme (Results)

Summer 2013

GCSE Design & Technology Resistant
Materials (5RM02/01)

Knowledge & Understanding of
Resistant Materials

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Summer 2013

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Question Number	Answer	Mark
1	C	(1)
Question Number	Answer	Mark
2	A	(1)
Question Number	Answer	Mark
3	C	(1)
Question Number	Answer	Mark
4	B	(1)
Question Number	Answer	Mark
5	B	(1)
Question Number	Answer	Mark
6	A	(1)
Question Number	Answer	Mark
7	D	(1)
Question Number	Answer	Mark
8	A	(1)
Question Number	Answer	Mark
9	B	(1)
Question Number	Answer	Mark
10	D	(1)

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11a	<table border="1"> <thead> <tr> <th></th> <th>Name</th> <th>Use</th> </tr> </thead> <tbody> <tr> <td>ai</td> <td>Tenon saw</td> <td>Cutting/sawing/straight lines/joints/shoulders of tenons (must reference wood) (1)</td> </tr> <tr> <td>aii</td> <td>Countersink/countersink bit/drill/machine countersink (1)</td> <td>Creates a shape for a screw head to sit in</td> </tr> <tr> <td>aiii</td> <td>Scriber</td> <td>Scratching/marking out/lines on the surface of metal/plastic/surface of metal/scoring plastic (1)</td> </tr> <tr> <td>aiv</td> <td>Knock down fitting</td> <td>Flat packed furniture / making/constructing joints/joining/holding wood/assemble/disassemble furniture (1)</td> </tr> </tbody> </table>		Name	Use	ai	Tenon saw	Cutting/sawing/straight lines/joints/shoulders of tenons (must reference wood) (1)	aii	Countersink/countersink bit/drill/machine countersink (1)	Creates a shape for a screw head to sit in	aiii	Scriber	Scratching/marking out/lines on the surface of metal/plastic/surface of metal/scoring plastic (1)	aiv	Knock down fitting	Flat packed furniture / making/constructing joints/joining/holding wood/assemble/disassemble furniture (1)	(4)
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Question Number	Answer	Mark
11bi	A. Bolt (1) B. Washer (1) C. Nut / lock nut (1) (only answers)	(3)

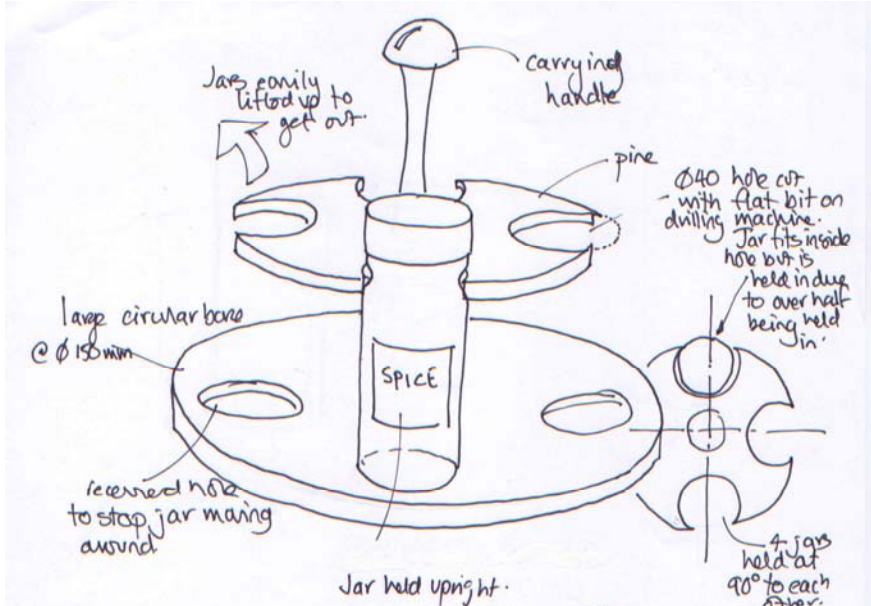
Question Number	Answer	Mark
11bii	Temporary (only answer)	(1)

Question Number	Answer	Mark
11c	1. Make sure the die is square/level/horizontal to the bar (1) 2. Rotate clockwise / forward to start cutting (1) 3. Rotate anticlockwise / backwards to break swarf (1)	(3)

Question Number	Answer	Mark
11d	Any two from: <ul style="list-style-type: none"> • Welding (MIG/TIG) / Spot / arc welding (1) • Soft soldering/silver soldering/soldering (1) • Brazing (1) (Only accept 1 form of welding/soldering if candidate gives 2) 2 x 1	(2)

Question Number	Answer	Mark
11e	<p>Two advantages explained from:</p> <ul style="list-style-type: none"> • No expensive mould/machine is required (1) which means that it will be cheaper (1) • Easy to recycle (1) which means less likely to be thrown away/added to landfill (1) • Easy to make different shapes and sizes (1) because there is no mould (1) • Bits can be pressed/stamped out (1) and then joined easily by welding/riveting (1) • Mild steel is tough (1) which means it can withstand knocks / bumps(1) • Mild steel is hard (1) which means it can withstand wear (1) • Easily welded (1) can be repaired/patched up (1) • High compressive strength (1) makes is capable of taking/carrying weight (1) • Relatively cheap (1) keeps material costs down (1) • Widely/readily available (1) making is easy to get (1) • Malleable (1) which means it can be pressed/folded into shape (1) <p>Do not accept 'Strong' or 'Durable'.</p> <p style="text-align: right;">2 x 1 2 x 1</p>	(4)

Question Number	Answer	Mark
11f	<p>One advantage explained from:</p> <ul style="list-style-type: none"> • Thinner / lighter sections (1) will need less material (1) • Fabricating the shape (1) will mean smaller pieces can be joined together (1) • Lay planning/ nesting / tessellations (1) will mean less waste (1) • Making it smaller/changing shape (1) will use less material (1) • Use CAD/CAM (1) to lay plan/laser cut (1) • Use templates to aid marking out (1) to minimise material waste (1) • It could be pressed (1) from a single piece/shape (1) • Use less/fewer components (1) and weld bits/pieces together (1) <p>Do not accept anything related to recycling/strong.</p> <p style="text-align: right;">2 x 1</p>	(2)

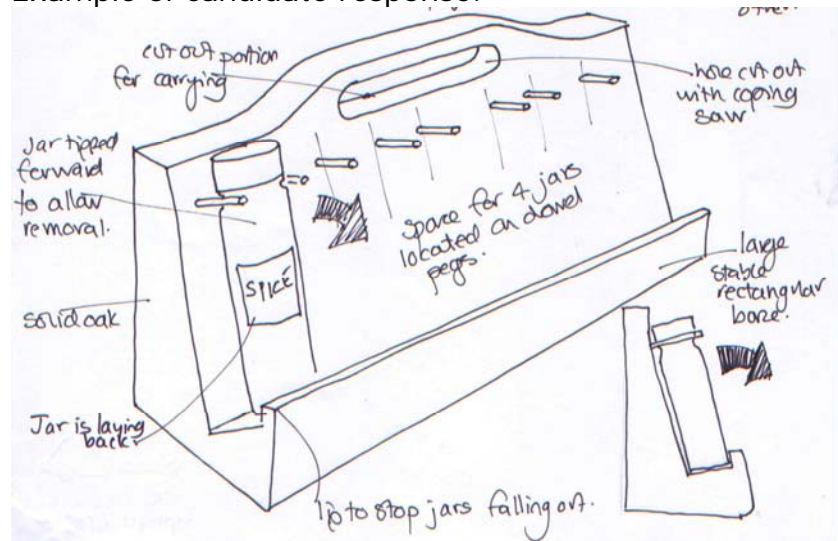
Question Number	Answer	Mark
12	<p>Design idea 1</p> <p>Candidates may answer any specification point in either graphical form or by annotation.</p> <p>No marks are awarded for the quality of graphical communication.</p> <ul style="list-style-type: none"> • Hold four spice jars (1) e.g. in the round/straight line/square/ (configuration) • Keep the spice jars upright (1) e.g. on a shelf / flat on a base/ containers • Allow for easy removal of the spice jars (1) e.g. lifted up/slide/pulled out / 40+ mm • Have a stable base (1) e.g. consideration of shape/large contact area • Be portable (1) e.g. handle/cut out/knob • Stop the jars from falling out when moved (1) e.g. holes/indents/lips/latches/vertical holders/open at top half • Be made from materials available in a school workshop (1) e.g. any named appropriate material • Be manufactured using processes available in a school workshop (1) e.g. any relevant named process <p>Example of candidate response:</p> 	

(8)

Design idea 2

Marks for design idea 2 can only be awarded where specification points are resolved differently than in design idea 1.

Example of candidate response:



(8)

Question Number	Answer	Mark
13a	<p>Two properties given from:</p> <ul style="list-style-type: none">• High impact strength (1)• Tough (1)• Scratch resistant/hard wearing (1)• Lightweight (1)• Durable (1)• Good resistance to chemicals / weather (1)• Plasticity (1)• Waterproof/resistant (1) <p>Do not accept 'easy to clean/strong'.</p> <p style="text-align: right;">2 x 1</p>	(2)

Question Number	Answer	Mark
13bi	<p>Two reasons given from:</p> <ul style="list-style-type: none"> • Improve the appearance of the product / make it look nicer/colour it (1) • Protect/prevent rusting/oxidation/corrosion of the surface of the material/product/more durable (1) • Make the product last longer/makes it easier to wipe clean (1) <p style="text-align: right;">2 x 1</p>	(2)

Question Number	Answer	Mark
13bii	<p>Two finishes given from:</p> <ul style="list-style-type: none"> • Paint (1) • Electroplating/plating/chrome plated (1) • Plastic dip coating (1) • Hammerite (1) • Powder finish (1) • Laquer (1) • Zinc plating/galvanising (1) <p>Only accept one form of paint.</p> <p style="text-align: right;">2 x 1</p>	(2)

Question Number	Answer	Mark
13ci	<p>One reason explained from:</p> <ul style="list-style-type: none"> • It is easily folded/collapsed/compacted (1) which means it takes up less space/halves in size (1) • The large surface area is flat/smooth (1) which means there are no difficult grooves / slots to clean/easy to wipe (1) • The surface is ABS (1) which can be easily wiped (1) • The surface is waterproof/water resistant (1) which means that dirt and grime will not be absorbed/stain the surface making it easy to wipe (1) • ABS is chemical resistant (1) so will not be damaged by cleaning products (1) • Table is foldable (1) make it easy to reach all parts (1) 	(2)

Question Number	Answer	Mark
13cii	One reason explained from: <ul style="list-style-type: none">• It is easily folded (1) which means it takes up less space (1)• The legs fold inwards (1) and the table top folds around to reduce the overall size (1)• It has a handle (1) which makes it easy to carry and move (1)	(2)

Question Number	Answer	Mark								
13d QWC	<p>Evaluation to address the following issues:</p> <p>User requirements What qualities make the product attractive to potential users?</p> <table border="1"> <thead> <tr> <th>Table A</th> <th>Table B</th> </tr> </thead> <tbody> <tr> <td> <ul style="list-style-type: none"> • Large flat surface area • Large stable base • Can be folded and stored away • Handle for easy carrying • Lighter and easy for carrying • More hygienic/wipe clean </td> <td> <ul style="list-style-type: none"> • Smaller and more intimate • Café style • More use of natural materials for table top • Will naturally age/weather • Can enhance appearance with stain/varnish </td> </tr> </tbody> </table> <p>Sustainability How does the design allow for environmental considerations?</p> <table border="1"> <thead> <tr> <th>Table A</th> <th>Table B</th> </tr> </thead> <tbody> <tr> <td> <ul style="list-style-type: none"> • Oil based products required to make plastics • Extraction and energy consumption in the production of the steel for the legs • Recycled / reused • Will last longer due to being stored away </td> <td> <ul style="list-style-type: none"> • Wooden top can be reused or recycled • Top will blend in better with natural environment • Aluminium can also be recycled but requires lots of energy to make </td> </tr> </tbody> </table>	Table A	Table B	<ul style="list-style-type: none"> • Large flat surface area • Large stable base • Can be folded and stored away • Handle for easy carrying • Lighter and easy for carrying • More hygienic/wipe clean 	<ul style="list-style-type: none"> • Smaller and more intimate • Café style • More use of natural materials for table top • Will naturally age/weather • Can enhance appearance with stain/varnish 	Table A	Table B	<ul style="list-style-type: none"> • Oil based products required to make plastics • Extraction and energy consumption in the production of the steel for the legs • Recycled / reused • Will last longer due to being stored away 	<ul style="list-style-type: none"> • Wooden top can be reused or recycled • Top will blend in better with natural environment • Aluminium can also be recycled but requires lots of energy to make 	(6)
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Level	Mark	Descriptor								
	0	No rewardable material								
Level 1	1-2	Candidate identifies the area(s) of comparison with no development OR identifies and develops one area. Shows limited understanding of the comparison. Writing communicates ideas using everyday language but the response lacks clarity and organisation. The candidate spells, punctuates and uses the rules of grammar with limited accuracy.								

Level 2	3-4	Candidate identifies some areas of comparison with associated developments showing some understanding of the comparison. Writing communicates ideas using D&T terms accurately and showing some direction and control in the organising of material. The candidate uses some of the rules of grammar appropriately and spells and punctuates with some accuracy, although some spelling errors may still be found.
Level 3	5-6	Candidate identifies a range of areas of comparison with associated developments showing a detailed understanding of the comparison. Writing communicates ideas effectively, using a range of appropriately selected D&T terms and organising information clearly and coherently. The candidate spells, punctuates and uses the rules of grammar with considerable accuracy.

Question Number	Answer	Mark
14a	<p>Two properties given from:</p> <ul style="list-style-type: none"> • Hard • Tough • Durable • High density • Non toxic <p>Do not accept 'strong'</p> <p style="text-align: right;">2 x 1</p>	(2)

Question Number	Answer	Mark
14bi	<p>Accept any one from:</p> <p>Housing joint (1) Housing (1)</p> <p>(Only answer)</p>	(1)

Question Number	Answer	Mark
14bii	<p>Accept any one from:</p> <ul style="list-style-type: none"> • PVA (1) • Cascamite (1) • Synthetic Resin (1) <p>(Only answers)</p>	(1)

Question Number	Answer	Mark
14ci	<p>Property</p> <ul style="list-style-type: none"> • Durable (1) <p>Justification</p> <ul style="list-style-type: none"> • Means they can be left outside and will not fade/discolour in the sunlight (1) <p>Property</p> <ul style="list-style-type: none"> • Waterproof (1) <p>Justification</p> <ul style="list-style-type: none"> • Means they can be left outside and will not absorb water/ can be put in a child's mouth/can be wiped clean (1) <p>Property</p> <p>Tough/impact resistant (1)</p> <p>Justification</p> <ul style="list-style-type: none"> • Means they can withstand knocks and bumps when being used (1) <p>Property</p> <ul style="list-style-type: none"> • Lightweight (1) <p>Justification</p> <ul style="list-style-type: none"> • Means they are not too heavy for children to play with/will not hurt them if they drop it (1) <p>Property</p> <ul style="list-style-type: none"> • Good chemical resistance (1) <p>Justification</p> <ul style="list-style-type: none"> • Means they can be washed with detergents (1) <p>Property</p> <ul style="list-style-type: none"> • Plasticity (1) <p>Justification</p> <ul style="list-style-type: none"> • Means it can be moulded/blown into shape (1) <p>Justification must be focused on the product rather than generic qualities.</p> <p style="text-align: right;">2 x 1 2 x 1</p>	(4)

Question Number	Answer	Mark
14cii	Any named process from: <ul style="list-style-type: none"> • Blow moulding (1) • Rotational moulding (1) 	(1)

Question Number	Answer	Mark
14d	<p>Two advantages described from:</p> <ul style="list-style-type: none"> • Products can be coloured/textured (1) to show what they will look like in real life/viewed from all angles (1) • Designs can be changed easily (1) without having to redraw the whole thing (1) • Files can be sent electronically via email (1) which saves time and money (1) • Electronic files can be linked to CAM machines (1) so that prototypes/models can be manufactured (1) • Performance modelling can be carried out (1) to test to destruction/see how strong/safe it is (1) • Reduce costs/saves money (1) as products do not need to be made for testing (1) • Material dimensions / properties can be changed (1) to identify the areas where less / more material may be needed (1) • All aspects are correct (1) before committing money which would be wasted if there were errors (1) • Customer feedback can be gathered (1) to see if it would sell/market research (1) • To see if individual pieces fit together (1) will reduce waste/materials/save time before manufacturing <p style="text-align: right;">2 x 1 2 x 1</p>	(4)

Question Number	Answer	Mark
14e QWC	<p>Indicative content</p> <p>Discussion to address the following issues:</p> <ul style="list-style-type: none"> • Once a product stops working it is thrown away • It is often cheaper to replace a product than to repair it • New and improved models/products are released by companies to entice new sales • Often some of the new models are cheaper than the older models • Replacement parts are often withdrawn by companies meaning that you cannot get spare parts • Some parts are designed to break/wear out before other parts so the product becomes unusable • New and developing technology and features mean people want the latest/newest products and gadgets • Generally acceptable amongst a large section of society / lazy / lack of knowledge to fix / repair things • Reliance on built in obsolescence to generate / perpetuate consumer cycle 	(6)

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