

Design and Technology

General Certificate of Secondary Education **1956/03**

Resistant Materials Technology Paper 3 (Foundation Tier)

Mark Scheme for June 2010

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
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Q	Expected Response	Mark	Additional Information
1ai	Beech, olive, Accept any hardwood except Balsa	[0-1]	Although the majority of hardwoods are not suitable for cooking utensils, beech and olive being the normal ones – at this level we will reward acknowledgement of any hardwood.
1aii	Very hard, tight grain, does not absorb liquids / oils easily, does not split easily, hygienic, non toxic, no after taste, easy to work with, easy to clean, durable	[0-1]	Any appropriate reason given. No dependency on previous answer Do not reward: anything to do with cost or strength
1b	Any named saw, plane, chisel (or named chisel), craft knife (for scoring the wooded pieces prior to gluing), spoke shave, rasp, surform, file, pencil, ruler, marking gauge, cutting gauge, try square, marking knife. Disc sander, sanding machine, linisher, glass paper, sandpaper, wire wool, sanding block,	[0-2]	Any saw must be a named saw i.e. do not reward “saw” on its own. Any wood working saw is acceptable Accept ‘plane’ or any named plane Accept ‘router’/ CNC machine Do not reward: hack saw, junior hack saw, rip saw, chain saw, Laser cutter Do not reward crayon or biro for marking out. Do not reward: anything to do with varnishing or painting or finishing
1c	PVA, waterproof PVA, Aerolite, polyurethane glue, Gorilla Glue, Excel, Cascamite, Animal glue	[0-1]	Do not accept: Wood glue, glue gun, superglue <u>Accept “aliphatic” adhesive</u>
1d	Batch production	[0-1]	There is only one correct answer (do not accept more than one response)
1e	The use of a template. Template with some form of marking round it indicated 1 mark for the word “template” Description / details for 2 nd mark. If cutting one out and drawing round it given, reward 1 mark max.	[0-2]	This part of the question is about marking out Accept the word stencil for 1 mark Accept the material given e.g. MDF, cardboard, metal (or a specific metal) for making the template for the 2 nd mark Do not accept Laser cutter

Q	Expected Response	Mark	Additional Information
1f	<p>Handle: Rounded corners, rounded edges, indentations for fingers, longer handle – easier to hold / control, hole in handle to hang tool, ridges to improve grip</p> <p>Blade: decreased angle to front edge, to improve the function, wider blade, edge of blade angled (left to right or vice versa), grooves along / across the blade</p> <p>1 mark for any 1 improvement plus, 1 mark for any additional detail.</p> <p>Detail could be the function of the improvement or how it could be achieved in the making of the tool OR</p> <p>1 x 1 mark for two simple modifications show but with no details given.</p>	[0-2]	<p>Any modification or improvements suggest which has some positive benefit. e.g. cleaner (plastic cover)</p> <p>Accept: adding another material i.e. plastic, to the handle, wrapping something round the handle</p>

Q	Expected Response	Mark	Additional Information
2a	Thermoplastic	[1]	There is only one correct answer Do not award a mark if both thermoplastic and thermosetting are stated.
2b	Easy to work with, easy to polish edges, can be polished to high standard, attractive material, modern material, comes in a range of colours, see through – can see the back of the jewelry, pre-coloured, coloured right through, simple to make, easy to make 1 x 1 mark for two different reasons	[0-2]	Do not reward: anything to do with cost, weight or strength Do not reward: more than 1 mark for 1 reason i.e. no extra mark for any justification being given.
2c	Copies would all be identical (same size/shape), high quality edges, modifications can be made to change the CAM outcome, different sizes can be made by changes to the drawing on screen, customisation can take place, no waste materials (swarf equivalent), speedy manufacturing compared to making them by hand, more accurate Look for a point of information plus clarification for 2 nd mark or two simple references to different point at 2 x 1 mark for each different point given. Quick, accurate	[0-2]	Do not accept cheaper than making by hand Accept “quick or quicker”
2d	Rubber feet fixed on to base, feet with lug fitting into a holes drilled into base, cork stick pads, felt glued to base, 1 mark for a simple solution plus 1 mark for details written or drawn	[0-2]	Accept elastic bands round base for 1 mark only. Accept “sticky backed feet for 1 mark only. If material give e.g. sticky backed cork feet award 2 marks Do not accept: additional pieces of acrylic stuck on to base unless some form of non-slip suggested Do not reward any change to counter top (glass counter) but award 1 mark for holes in base for screws Reward double sided tape
2e	Correct shape/angle of jig or former of some kind = 1 mark Method of holding material in place = 1 mark Additional technical details and thinking 0-1 marks	[0-3]	Reward information from either notes or sketches. N.B. Do not reward labels, only notes which expand

Q	Expected Response	Mark	Additional Information
3a	Coated in zinc / plated with zinc = 1 Explanation and understanding : (required for 2 nd mark) To protect the steel = 1, to stop the steel rusting = 1, to coat the steel = 1, to keep the air / moisture from attacking the steel = 1	[0-2]	There must be some explanation/understanding of galvanising (zinc) to gain the maximum of 2 marks
3b(i)	Cutting out and bending: Fewer processes, less potential errors in quality from miss-assembly, more accurate, less “bulk” because of welds, strong in one piece, no joins, easier to make, simpler 2 x 1 for different points	[0-2]	Accept: reference to either method of manufacture to demonstrate understanding Do not accept cost or quicker Fabricated: more processes has to be cut out, prepared, cleaned, held in place, heated, cooled and cleaned again to remove welding/brazing residues. Difficulties in holding them in position when assembling, slower to assemble, more chance of a piece being inaccurate and so effect the final product, need to clean the joints up after fabrication, Reward information if candidates refer to the positives of cutting and bending or the negatives of fabrication .
3b(ii)	1 mark for the bend lines in more or less correct place 1 mark for the drilling centres more or less in correct shape. 		Both bend lines must be shown to gain the mark. Both centres must be shown to gain the mark. Note – the two bend lines need to be inside the end of the inner rectangle. (see diagram at head of question) and away from the inside corner
3c	Some alteration to improve grip / hold / lifting of the “throw latch”  A knob, lug, lip –any method of ergonomic improvement 1 mark for improvement plus 1 mark for details	[0-2]	Reward any simple method of giving an improved grip to the “throw latch”
3d	Welding and brazing Accept: MIG, TIG, ARC, SPOT, GAS welding Accept: hard soldering Accept riveting	[0-2]	Do Not accept silver soldering or soldering

Q	Expected Response	Mark	Additional Information
<p>This is an overlap question with the higher tier Q 1. Based on Industrial practices including CAD/CAM and/or effects of D&T in society.</p>			
4a	<p>Points must be specific to a smoke detector and NOT generic A smoke alarm must:</p> <ul style="list-style-type: none"> be mounted on a wall / ceiling be lightweight, must be justified for a mark be easy to dismount for cleaning / maintenance be easy to keep clean take a standard battery be easy to change the battery be battery operated/power source low energy consumption give a warning when the battery gets low be loud enough to wake people up / for people to hear be sensitive to smoke/give entry to smoke/not over sensitive to smoke remain functional for a short period if it gets hot have a visual warning for deaf people test button/reset button/override 	[0-3]	<p>This list is not prescriptive. If a 'specific' point is given that relates to smoke alarms reward it. Do not reward generics e.g. be aesthetically pleasing, safe to use, easy to use. Do not reward anything to do with cost or off button Accept 'wired in to mains' Accept specifications written in question format</p> <p>3 x 1 mark for correct responses</p> <p><i>Scoris issue: Check all 3 specification points before entering your mark.</i></p>
4b	<p>Less money tied up in stock, less storage space needed, less change of stock deteriorating if not used, less insurance costs incurred for stock or finished products, less storage space for finished products – they are <i>made to order</i>, smaller premises, no overseeing of stock or products, no stock rotation required, better cash flow.</p>	[0-2]	<p>Responses might be either related to stock materials in or to finished product out or a combination Examples might be given – if correct reward positively</p> <p>2 x 1 for each benefit (avoid repeats) Benefit with explanation 0-2 marks</p>
4c	<p>Packaging for protection Communication informing customers of content, legal information required, weights / sizes, manufacturers details To Sell Inform and encourage buyers to purchase Goods need to match their description. This means that if there is a verbal or written description of the goods and the labelling has his information</p>	[0-2]	<p>This is not restricted to the packaging of Smoke alarms it is <u>packaging "of products"</u></p> <p>1 mark for a point plus 1 mark for explanation OR 2 x 1 marks for two different points</p> <p>Reward packaging or labelling or both Reward wider responses if some understanding is shown</p>

Q	Expected Response	Mark	Additional Information
4d	British Standard, kite mark, a mark of quality, a mark of safety, similar to the CE mark but British equivalent, up to standard, meets standard, safety, quality. tested	[0-1]	<p>BSI Kite symbol that means that it has been tested to destruction to make sure it meets the requirements of health and safety and</p> <p>Quality control checks are made during manufacture of the smoke alarms. <i>British</i></p> <p>Give two reasons why manufacturers need to undertake quality control checks. <i>(aw)</i></p> <p>Reward: British Standards Institution or a "good" description as above</p> <p>Do not reward 'standard'</p>
4e	Customer satisfaction, company image, legal reasons / standards, maintain standards, maintain quality of goods / image / reputation, ensuring safety / consistency / quality, to meeting: CE / BSI standards / kite mark, ensure correct working, meets any set tolerances, checking for faults, check to see if parts fit, avoid wasted production. Every part in correct place.	[2]	<p>2 x 1 mark for different points given, do not reward repeats</p> <p>Consider 1+1 for extension</p>

Q	Expected Response	Mark	Additional Information
This is an overlap question with the Foundation tier question 2 This has pre-release material and so candidate should respond well			
5a	Easier storage, easier to transport, space saving, smaller storage, one easier to pack away after lessons / events, can move more than 1 at a time	[0-2]	If two different reasons are given on one line award marks 2 x 1 for two different reasons
5b	Polypropylene, HDPE, Polyethylene	[1]	Do not reward: LDPE, fibreglass, ABS, Styrenes, HIPs, Acrylic, PVC
5c	Steel, mild steel, steel tube, stainless steel,	[1]	Do not reward: Iron, aluminium
5d	Protection stops rusting/corrosion, aesthetic improvement, make it look better, colour coding for different situation / locations, keep moisture / air away from steel.	[1]	Do not award 'prevents wear'
5e	Plywood	[0-2]	Plywood is the only suitable manufactured board. Do not award laminate. Accept a description e.g. a wood made of layers, A board with layers and the grain going in different directions.
5f	Lamination, laminating, steam bending	[1]	Accept a description of process Do not reward "bending"
5g	<p>A modification is needed on each side of the chair Pieces attached which need to interlock in some way for example: 'A pin / lug with a head into a 'V' shaped recess / a keyhole shape'</p> <div style="display: flex; align-items: center;"> <div style="margin-right: 10px;"> 1 mark for method of attachment 1 mark for ease of detachment 1 mark for additional technical detail. </div> <div style="font-size: 3em; margin-right: 10px;">}</div> <div>Be flexible. Will it work?</div> </div>	[0-3]	Do not reward: permanent attachments or anything which needs tools or is "difficult" to link the chairs This could be a modification to both chairs or simply something on one part of the chair for example a welded ring on one of the legs Ignore references to stacking or the need to stack

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