

GCSE

Design and Technology

General Certificate of Secondary Education **1956/04**

Resistant Materials Technology Paper 4 (Higher Tier)

Mark Scheme for June 2010

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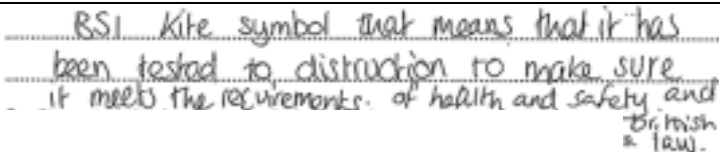
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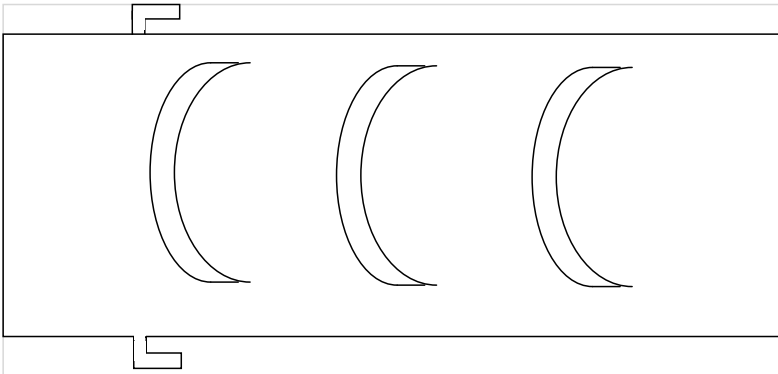
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Q	Expected Response	Mark	Additional Information
	<p>This is an overlap question with the Foundation tier Q 4. Based on Industrial practices including CAD/CAM and/or effects of D&T in society.</p>		
1a	<p>Points must be specific to a smoke detector 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 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 Do not reward on/off switch 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>
1b	<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>

Q	Expected Response	Mark	Additional Information
1c	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 this information	[0-2]	This is not restricted to the packaging of Smoke alarms it is <u>packaging</u> “of products” 1 mark for a point plus 1 mark for explanation OR 2 x 1 marks for two different points Reward packaging or labelling or both Reward wider responses if some understanding is shown
1d	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.	[0-1]	 Reward: British Standards Institution or a “good” description as above Do not reward ‘standard’
1e	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	[2]	2 x 1 mark for different points given, do not reward repeats Consider 1+1 for extension

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		
2a	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
2b	Polypropylene, HDPE, Polyethylene	[1]	Do not reward: LDPE, fibreglass, ABS, Styrenes, HIPs, Acrylic, PVC
2c	Steel, mild steel, steel tube, stainless steel,	[1]	Do not reward: Iron, aluminium
2d	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'
2e	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.
2f	Lamination, laminating, steam bending	[1]	Accept a description of process Do not reward "bending"
2g	<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> <p>1 mark for method of attachment } 1 mark for ease of detachment } Be flexible. Will it work? 1 mark for additional technical detail.</p>	[0-3]	<p>Do not reward: permanent attachments or anything which needs tools or is "difficult" to link the chairs</p> <p>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</p> <p>Ignore references to stacking or the need to stack</p>

Q	Expected Response	Mark	Additional Information
3a	<p>Marking out: use of try square, ruler, scribe, chinograph pencil, pencil / biro if related to protective paper / polyethylene cover</p> <p>Cutting out: drilling a hole = 1 mark, feeding a thin bladed saw blade through hole and sawing = 1</p> <p>Drilling a hole = 1 and using a coping saw = 1</p> <p>Finishing off: filing rough saw cuts, polishing with emery cloth / wet and dry paper</p> <p>Any 3 <i>different</i> stages or part stages - reward 1 mark each.</p> <p>Alternative: If the marking out (or cutting or finishing) is detailed then up to 2 marks (3rd mark has to be for method of material removal).</p>	[0-3]	<p>Reward: Marking out, Cutting out or Finishing off for 0-3 marks but 1 mark has to be related to a method of material removal.</p> <p>Laser cut equals 1 mark maximum but will count as the “cutting out” mark but will not then gain a mark for the “marking out” or “finishing” unless clarified by the response</p> <p>Do not reward: saw, or sawing</p> <p>Stages may not be explained in order but responses to be rewarded if correct to application in question</p> <p>Do not reward CAD (this is designing) or CAM unless specific details given for example “laser cutter”</p>
3b	<p>1 mark for three slots irrespective of shape</p> <p>1 mark for generally correct position of the three slots</p>  <p>1 mark for the lugs, both needed for mark (see the two different representations of lugs above - accept either)</p> <p>1 mark for correct curve of slots</p> <p>Do not worry about the end of the slots we are looking for the curve</p>	[0-4]	<p>No mark is conditional on the others.</p> <p>For 1st mark: If only 1 or 2 slots shown no mark</p> <p>For 2nd mark: if one or 2 slots shown and are “generally” in correct position – then reward. Do not reward sloping slots</p> <p>For 3rd mark: both lugs needed and in correct orientation</p> <p>For the 4th mark do not reward straight slots no matter where they are located we are looking for curves.</p> <p>If in 3D do not reward – a “net” is required</p> <p>Reward only one drawing</p>

Q	Expected Response	Mark	Additional Information
3c	1 mark for a potentially successful method plus 0-2 marks for some “actual” technical detail (fixing, fixing hole, materials, sizes) Reward technical detail if potential is zero.	[0-3]	Do not reward: a solution /modification which changes or does away with the lug system Must disassemble to fix to wall Do not reward: generic terms such as “glue” a plastic “sheet”. Ideally this should read “....glue using tensol an additional sheet of acrylic....” Technical detail of materials, glue, screws must be specific.

Q	Expected Response	Mark	Additional Information
4a	Protection, stop the toy getting dirty, grubby, makes it easier to clean, makes it look attractive, gives a shiny / attractive surface, Smooth to touch, improves durability	[1]	Do not reward reference to splinters
4b	Look for three specific appropriate stages, processes or correct tools For example- 1: drill a hole of appropriate size 2: saw down the sides to the hole(allow junior hacksaw, hacksaw) 3: fine finishing with chisel, file, glass paper (accept "sand down")	[0-3]	If "saw the shape out" reward maximum of 1 mark
4c	0-1 for an interesting feature drawn: examples could be flag waves, figure pops up, bells rings, drawbridge moves up or down, cannons, slings. 0-1 detail of feature for example materials, fixings, construction, sizes, colour or attachment of feature 0-1 for attachment/caption/retention to toy/castle 0-1 details of attachment/caption/retention to toy/castle 0-1 mechanism/operation for example pivots, levers, pulleys, sliders 0-1 details of mechanism/operation	[0-6]	Tick on question where marks are awarded. e.g.1: a buzzer goes is not a resistant materials solution (zero marks) unless the switching method is explained operated by the handle (possible marks). e.g.2: a figure pops up with a flag solution gains marks Note the thickness of the back piece where the hanger goes through is quite thin. However you can reward if dowelling / rod are suggested. No set mechanism.

Q	Expected Response	Mark	Additional Information
5a	<p>Possible solutions: some bracket / riveted / bolted / slots cut with folded tabs to locate and hold 2mm thick sheets steel to the 14mm steel tube. Tube might be flared, split, folded, angled.</p> <p>Modification/attachment to tube = 1 mark Modification/attachment to the steel plate = 1 mark Additional technical detail OR will it work = 1 mark</p>	[0-3]	<p>There is no welding or brazing facilities so do not reward reference to these methods or for ‘technical or will it work’ mark.</p> <p>If welding is used as part of a solution award max 2 marks for other details Do not reward: soldered or glued even if epoxy resin quoted for ‘technical or will it work’ mark. Ignore the angle of the sheet steel plate</p>
5b	<p>Positive/explicit understanding of the tube diameters must be shown for full marks.</p> <p>Sleeve of some kind. Possibly a block or addition with holes to house both pieces. One section is likely to have a permanent type of fixing with the other moving / adjustable.</p> <p>Marks are awarded for:</p> <ul style="list-style-type: none"> 0-1 Height adjustment 0-1 Positive locking in different positions (friction device is not a positive lock) 0-1 Method doesn't require tools 0-1 Additional technical detail OR will it work 	[0-4]	<p>There is no welding or brazing facilities so do not reward reference to these methods or for ‘technical or will it work’ mark.</p> <p>If welding is used as part of a solution award max 2 marks for other details Do not reward: soldered or glued even if epoxy resin quoted for ‘technical or will it work’ mark.</p> <p>The two tubes are the same diameter and so will <u>NOT</u> slot one inside the other! If candidate misses this point award a maximum of 2 marks from the following:</p> <ul style="list-style-type: none"> 0-1 height adjustment 0-1 Positive locking in different positions 0-1 No tools required <p>zero no matter what details are given If tools are needed to operate the system the maximum mark for this part of the question is 2 marks in total.</p>
5c	<p>The “rods” i.e. the legs must attach and detach in some way: look for a pivot / nut and bolt rivet or similar, internal & external threads. They do not have to fold but this could contribute to the solution. Rods riveted to a ring of correct size, holes drilled in the 16mm steel tube and bends in the Ø8mm steel rods. Ends flattened, or flared could all contribute to a solution</p> <ul style="list-style-type: none"> 0-1 Method of attachment 0-1 Method of removal or folding 0-1 Additional technical detail OR will it work 	[0-3]	<p>There is no welding or brazing facilities so do not reward reference to these methods or for ‘technical or will it work’ mark.</p> <p>If welding is used as part of a solution award max 2 marks for other details Do not reward: soldered or glued even if epoxy resin quoted for ‘technical or will it work’ mark.</p>

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