

Mark Scheme (Results) Summer 2008

GCSE

GCSE Design & Technology: Resistant Materials Technology (1973) Paper 2H

1973 2H Mark Scheme

Question Number	Answer	Mark
1 (a)	<p>(It is essential that the point and reason both fully relate to the market, environment and quality)</p> <p>Note: Original specification points are:</p> <ul style="list-style-type: none"> • Be easy to grip with wet hands • Show if the tap will be used for hot or cold water 	
1 (a)(i)	<p>Market</p> <ul style="list-style-type: none"> • Point: Suitable for mass/batch production • Reason: Large demand / every household requires at least 1 set of taps • Point: Must look attractive / stylish / aesthetic / appeal • Reason: To increase sales / attract customers • Point: Easy to fit • Reason: Need for few skills / tools / equipment / DIY installation / reduces costs <p style="text-align: right;">(2 x 1)</p>	(2)
1 (a)(ii)	<p>Environment</p> <ul style="list-style-type: none"> • Point: Can be made from recycled materials • Reason: To reduce the amount of new materials required / conserve virgin materials / reduce impact of mining for new materials • Point: Should be recycled • Reason: To reduce landfill / use materials to make new items / products / protect environment. <p style="text-align: right;">(2 x 1)</p> <p><i>(answers must relate to environmental considerations with respect to where the materials come from)</i></p>	(2)

1 (a)(iii)	<p>Quality</p> <ul style="list-style-type: none"> • Point: Smooth surface finish on tap • Reason: So no one cuts / scrapes their hands / when using the taps • Point: Durability / ability to withstand deterioration and corrosion • Reason: Give long life / reliable performance / last longer / fewer replacements • Point: Can be easily maintained • Reason: Reduces expensive replacement costs • Point: Good fitting of all parts • Reason: So tap operates quickly/will not drip/leak <p style="text-align: right;">(2 x 1)</p> <p><i>(Do not accept any answers relating to quality of materials)</i></p>	(2)
1 (b)(i)	<p>Two reasons given from:</p> <ul style="list-style-type: none"> • Will not rust / corrode (1) • Casts well (1) • Turns / machines well (1) <p style="text-align: right;">(2 x 1)</p>	(2)
1 (b)(ii)	<p>Two reasons given from:</p> <ul style="list-style-type: none"> • More aesthetically pleasing / looks good (1) • Easier to keep clean (1) • Will not tarnish / discolour / oxidise(1) • Can be done on a large scale (1) • Will withstand bathroom cleaning materials (1) • Use a more expensive material to finish the surface with (1) <p style="text-align: right;">(2 x 1)</p> <p><i>(Do not accept smooth/good surface finish/prevents rust)</i></p>	(2)

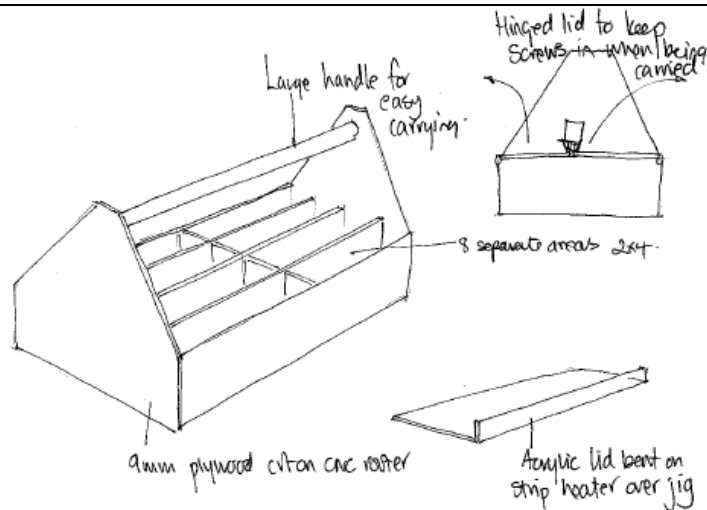
1 (c)	<p>Two properties and reasons given from:</p> <ul style="list-style-type: none"> • Property: Waterproof / will not absorb water • Reason: Will not be affected by wet hands / water • Property: Electrical insulator / will not allow electricity to pass through it • Reason: Will not conduct electricity if taps become live. • Property: Durable / hard • Reason: Will withstand the knocks and bumps it will be subjected to in the bathroom / last longer / being twisted • Property: Plasticity/moulds easily • Reason: Can be moulded into complex shapes / high standard of finish / can be mass produced. • Property: Good insulator of heat • Reason: Will not get burnt from the hot tap • Property: Wide range of colours available • Reason: Can be coloured to match surroundings/temperature of water • Property: Resistance to cleaning products/household chemicals • Reason: So that the surface will not be damaged/pitted <p style="text-align: right;">(4 x 1)</p>	(4)
1 (d)	<p>Two quality control checks named from:</p> <ul style="list-style-type: none"> • Quality of surface finish (1) • Dimensional accuracy / does it fit (1) • Colour match against control piece (1) • No sharp edges (1) <p style="text-align: right;">(2 x 1)</p>	(2)
1 (e)	<p>One way described from:</p> <ul style="list-style-type: none"> • It is a single piece but a complicated shape which cannot be cut by hand • The grooves/texture could be cut by a milling machine but it would be too expensive and take too long • Several handles can be moulded at the same time which would cut down the unit cost / production time • Tapers one way which makes it easier to mould (release) • Solid sided shape which cannot be formed by vacuum forming. <p style="text-align: right;">(2 x 1)</p>	(2)

1 (f)(i)	<p>One purpose explained:</p> <ul style="list-style-type: none"> • The tap is tapered/ ergonomically shaped which means that you can hold it easier/ fits the shape of the hand better • The grooves provide a texture/increase surface area which makes it easier to get hold of/ to turn with wet hands • Any excess water will run down the tapered grooves and away which stops the handle being wet and slippery to get hold of <p style="text-align: right;">(2 x 1)</p>	(2)
1 (f)(ii)	<p>One purpose explained:</p> <ul style="list-style-type: none"> • The coloured insert ring (red/blue) reflects what the temperature of the water, either hot (red) or cold (blue) <p style="text-align: right;">(2 x 1)</p>	(2)
Total for question		22

Question Number	Answer	Mark
2 (a)	<ul style="list-style-type: none"> • Copper (1) • Zinc (1) <p>(Only answers)</p>	(2 x 1) (2)
2 (b)	<ol style="list-style-type: none"> 1. Mortice (1) and tenon (1) 2. Dowel / peg (1) 3. Housing (1) <p>(Only answers)</p>	(4 x 1) (4)
2 (c)(i)	<p>Three risks given from:</p> <ul style="list-style-type: none"> • Splashes in eyes / on skin / irritant (1) • Fumes / inhalation / toxicity (1) • Fire / flammability (1) • Danger of spilling / slipping (1) • Use of solvents / cleaning of brushes (1) 	(3 x 1) (3)
2 (c)(ii)	<p>One reason explained from:</p> <ul style="list-style-type: none"> • More durable therefore will last longer • More durable because the surface will be protected / improve resistance to moisture • A higher quality product will therefore increase the sales / reputation of the company • Appearance is enhanced which is likely to make the product more appealing • Safer to handle because the surface will be smoother • The nature of the varnished surface will allow the steps to be wiped and kept clean • Wood grain / splits / splinters can be easily seen • Protect the wood/surface which means will resist moisture/dirt 	(2 x 1) (2)
2 (d)	<p>Three reasons given from:</p> <ul style="list-style-type: none"> • Flexible / easy to program (1) • Greater accuracy / reliability / identical / quality / repeatability(1) • Faster than manual labour (1) • Can run 24/7 (1) • Easily converted files from CAD drawing (1) • Safer working procedures (1) • Fewer workers required (1) <p>(Do not accept easy / fast / cheap/ safe unless qualified)</p>	(3 x 1) (3)

2 (e)	<p>Two reasons explained from:</p> <ul style="list-style-type: none"> • If the top step is made too small it might result in the user falling off • If the surface finish is not up to standard / too rough it might not be appropriate to receive a surface finish • If the quality of the wood used contains knots / defects / splits it might break when the user stands on it / be strong enough to support the weight • If the grooves are not deep enough then it might not provide sufficient tread and the user might slip off • If it is not the right size it will not fit other parts when connected / will be scrapped <p style="text-align: right;">(4 x 1)</p>	(4)
2 (f)	<p>Two reasons explained from:</p> <ul style="list-style-type: none"> • Faster than post because it is instant when using e-mail • Cheaper than posting because large files can be sent without having to spend lots of money on heavy sets of papers / documents • Amendments can be made quickly / easily because they are in an electronic format • Can be sent worldwide faster because the files are sent down a telephone line and not overland • Messages can be bounced back allowing for instant feedback • Files are in electronic format which means they can be loaded straight into machines / CAM <p style="text-align: right;">(4 x 1)</p>	(4)
Total for question		22

Question Number	Answer	Mark
3	<p>DESIGN IDEA 1 Each point of specification has two marking points.</p> <p>1 mark should be awarded for evidence of each point of specification in the design.</p> <p>2 marks for each specification point with both elements viably satisfied</p> <p>1 mark for each specification point with only one element viably satisfied</p> <p>No marks where the answer does not viably answer a specification point</p> <p>Candidates may answer any specification point in either graphical form or by annotation.</p> <p>No marks are awarded for quality of communication.</p> <p>Be easy to hold in the hand and carry</p> <ul style="list-style-type: none"> • Indication that the tidy is easy to hold in the hand (1) E.g. handles / straps / cut outs • Evidence that it is portable (1) E.g. size / balance / overall shape and proportion <p>Provide easy access to eight different sizes of screws</p> <ul style="list-style-type: none"> • Provides easy access to 8 different areas (1) E.g. eight separate areas / spaces / trays • For holding screws (1) E.g. spaces big enough to hold different sized screws <p>Keep the different sizes of screws separate and stop them from falling out when being carried</p> <ul style="list-style-type: none"> • Hold the screws separately (1) E.g. separate areas / trays / boxes / drawers • Stop the screws falling out when being carried (1) E.g. lids on boxes / slide over lids / cover over whole tray / catch / lock <p>Be made from materials and processes that allow the screw tidy to be produced in batches of 5000</p> <ul style="list-style-type: none"> • Evidence of suitable materials (1) E.g.(specific named materials for processes named) • Evidence of appropriate processes (1) e.g.(appropriate for batches of 5000) 	



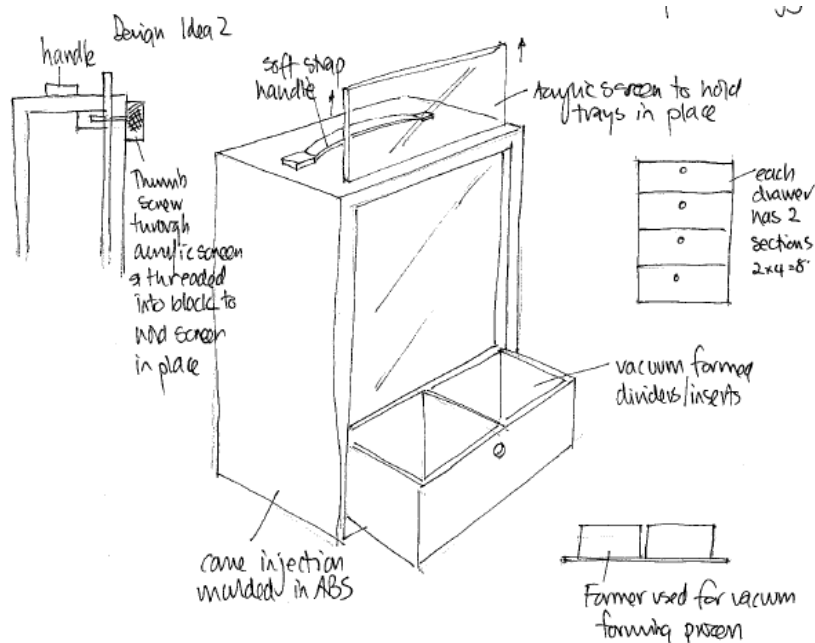
(8)

DESIGN IDEA 2

To score a mark for Design Idea 2, each specification point must be resolved again in the second design idea but the second design idea must be **technically / conceptually different in design and construction** from the first and not a simple variation on a theme to score the mark.

Use exactly the same criteria as design idea 1 to mark design idea 2.

- A different method of holding the tidy in the hand (1)
- A different way of carrying (1)
- A different way of providing eight different areas (1)
- A different way of holding the screws (1)
- A different way of separating the screws (1)
- A different way of stopping the screws from falling out (1)
- A different material (1)
- A different process (1)



(8)

<p>3 (b)</p>	<p>Each point clearly evaluated.</p> <p>If a candidate has indicated design idea 1 and then evaluates design idea 2 for all or part of (i), (ii) or (iii) then the idea in greater evidence should be marked.</p> <p>The evaluation of the design must contain reference to either positive or negative aspects not just simply a description of the design.</p> <p>Award 1 mark for a correct evaluation / justification relating to each design feature and how it succeeds or fails</p> <p>Repetition of original spec scores 0</p>	
<p>3 (b)(i)</p>	<p>Evaluation of: easy to hold in the hand and carry</p> <p>Positive or negative comments relating to:</p> <ul style="list-style-type: none"> • Clear indication that it can be held in the hand • How is it carried? <p style="text-align: right;">(2 x 1)</p>	<p>(2)</p>
<p>3 (b)(ii)</p>	<p>Evaluation of: provide easy access to eight different sizes of screws</p> <p>Positive or negative comments relating to:</p> <ul style="list-style-type: none"> • Easy access • Eight different areas for the screws <p style="text-align: right;">(2 x 1)</p>	<p>(2)</p>
<p>3 (b)(iii)</p>	<p>Evaluation of: keeping the different sizes of screws separate and stop them from falling out when being carried</p> <p>Positive or negative comments relating to:</p> <ul style="list-style-type: none"> • A method of holding the screws • To stop the screws falling out when being carried <p style="text-align: right;">(2 x 1)</p>	<p>(2)</p>
<p>Total for question</p>		<p>22</p>

Question Number	Answer	Mark
4 (a)	<p>Three properties given from:</p> <ul style="list-style-type: none"> • Hard / ability to withstand indentation / abrasion • Tough / ability to withstand knocks and bumps / wear and tear • Durable / good weather/moisture resistance • Dense / close grained / close structure <p>(Do <i>not</i> accept hardwood)</p>	<p>(3 x 1) (3)</p>
4 (b)	<p>One explanation from:</p> <ul style="list-style-type: none"> • Chipboard absorbs water easily / is not durable and will therefore quickly swell / break down / degrade. • Chipboard breaks / bends easily because it is made from small chips of wood / has no grain 	<p>(2 x 1) (2)</p>
4 (c)	<p>One explanation from:</p> <ul style="list-style-type: none"> • It will last longer in the ground because wood will rot away / more quickly than steel will rust away • Steel is more stable than wood and therefore the compost bin will retain its shape / not fall apart • Wood will warp / twist and therefore the compost bin may lose its shape / fall apart • Can be driven into the ground easier than oak as it does not break / split / splinter 	<p>(2 x 1) (2)</p>

<p>4 (d)</p>	<p>Two properties given and reasons from:</p> <ul style="list-style-type: none"> • Property: Plasticity / easily moulded • Reason: Easily injected / squeezed into the mould for manufacture • Property: Durable • Reason: It will not decay / deteriorate when left outside / last a long time • Property: Waterproof • Reason: Will not absorb water and rot • Property: Tough • Reason: Will withstand the knocks and bumps in the garden • Property: Can be coloured • Reason: So that it fits in more naturally with the environment • Property: Flexibility • Reason: So that the lid and access panel can be snapped in to position • Property: Lightweight • Reason: So that it is easy to move / lift the lid <p style="text-align: right;">(2 x 1) (2 x 1)</p>	<p style="text-align: center;">(4)</p>
<p>4 (e)</p>	<p>Three benefits explained from:</p> <ul style="list-style-type: none"> • Less landfill required which therefore does not require / demand so much land • Less waste burned which therefore means that less pollution is created from burning • Less mining for new materials / conserve existing resources because the demand for new materials would be partly met by the recycling of old materials • Less fuel used in burning/incinerating waste which therefore means greater conservation of fuel • No toxic gases emitted into environment because less waste is being burnt • Less energy is used in recycling / reprocessing of materials, in comparison to producing virgin materials • Green waste can be composted therefore reducing landfill / improving soil • Re-using plastic bags which means less of them going into landfill / hundreds of years to breakdown <p style="text-align: right;">(6 x 1)</p> <p>(Do not accept just 'global warming stopped /reduced')</p>	<p style="text-align: center;">(6)</p>

4 (f)	<p>One explanation from:</p> <ul style="list-style-type: none"> • Product / spares are likely not to be available which means it cannot be repaired if it breaks / have to buy a new item • Sealed products which have batteries inside cannot be replaced which means it has to be thrown away and a replacement bought • Companies update / introduce new technologies / withdraw products which therefore means consumers have to buy new / replacement products <p style="text-align: right;">(2 x 1)</p>	(2)
4 (g)	<p>Three moral objections given from:</p> <ul style="list-style-type: none"> • Waste of materials / using more of the planets resources to make new products / raw materials (1) • Waste of energy in manufacture / transport (1) • Disposal / recycling issues associated with discarded product (1) • Encourages consumer spending / debt (1) • Peer pressure / bullying to maintain status (1) • Exploitation of third world countries in supplying cheap labour / products to meet consumer demand (1) • Over-inflate prices due to demand (1) <p style="text-align: right;">(3 x 1)</p>	(3)
	Total for question	22
	Total for paper	88