

# Mark Scheme Summer 2009

GCSE

## GCSE Design and Technology: Resistant Materials Technology (1973/3973)

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1973 2F Mark Scheme

Question Number	Answer	Mark
Q01(a)	<p>Name: Vice Do not accept clamp Use: Holding/ clamping / securing work</p> <p>Name: Gauntlets / gloves Use: Holding hot things / protecting/stop burning your hands / handling sharp materials</p> <p>Name: Camera Use: Taking/capturing/storing photographs / video / images</p> <p>Name: Scanner / copier Use: Scanning/copying images / pictures Do not accept photocopier</p> <p>Name: Tap Use: Cutting a thread</p>	(10 x 1) (10)
Q01(b)(i)	Stain (only answer)	(1 x 1) (1)
Q01(b)(ii)	<p>One reason given from:</p> <ul style="list-style-type: none"> <li>• to stop it going hard / stiff / bristles sticking together</li> <li>• so it can be used again</li> <li>• to remove paint/varnish</li> <li>• so the colour does not come out/run when used again / spread / contaminate</li> </ul>	(1 x 1) (1)
Q01(b)(iii)	<p>Two reasons given from:</p> <ul style="list-style-type: none"> <li>• make it look nicer / improve aesthetic appeal</li> <li>• fit in with colours of product range / company colours</li> <li>• easier to keep clean / protect the surface</li> <li>• improve durability</li> <li>• sweat from hands will not effect the timber</li> </ul>	(2 x 1) (2)
Q01(c)	<p>One reason given from:</p> <ul style="list-style-type: none"> <li>• does not need / require any secondary finishing</li> <li>• speeds up production time / faster</li> <li>• can result in a smooth finish on the brush handle</li> <li>• requires less labour / contact</li> </ul> <p>(Do not accept easier/cheaper)</p>	(1 x 1) (1)

Q01(d)	1. barcode 2. internet 3. stock levels (only answers) <p style="text-align: right;">(3 x 1)</p>	(3)
Q01(e)	Two different types of information given from: <ul style="list-style-type: none"> <li>• access <b>hand</b> sizes / ergonomics data</li> <li>• surveys of favourite colours</li> <li>• client feedback/blog</li> <li>• analysis of existing products</li> <li>• research possible materials</li> </ul> <i>(Do not accept anything relating to price / range of brush sizes / bristle)</i> <p style="text-align: right;">(2 x 1)</p>	(2)
Q01(f)	Two advantages given from: <ul style="list-style-type: none"> <li>• changes can be updated easily</li> <li>• ideas can be sent to others</li> <li>• can be linked straight to CAM machines</li> <li>• colour / render / texture can be applied</li> <li>• full 3D virtual products can be viewed from all angles</li> <li>• files emailed to manufacturers</li> </ul> <i>(Do not accept faster / quicker / easier)</i> <p style="text-align: right;">(2 x 1)</p>	(2)
<b>Mark Total</b>		<b>22</b>

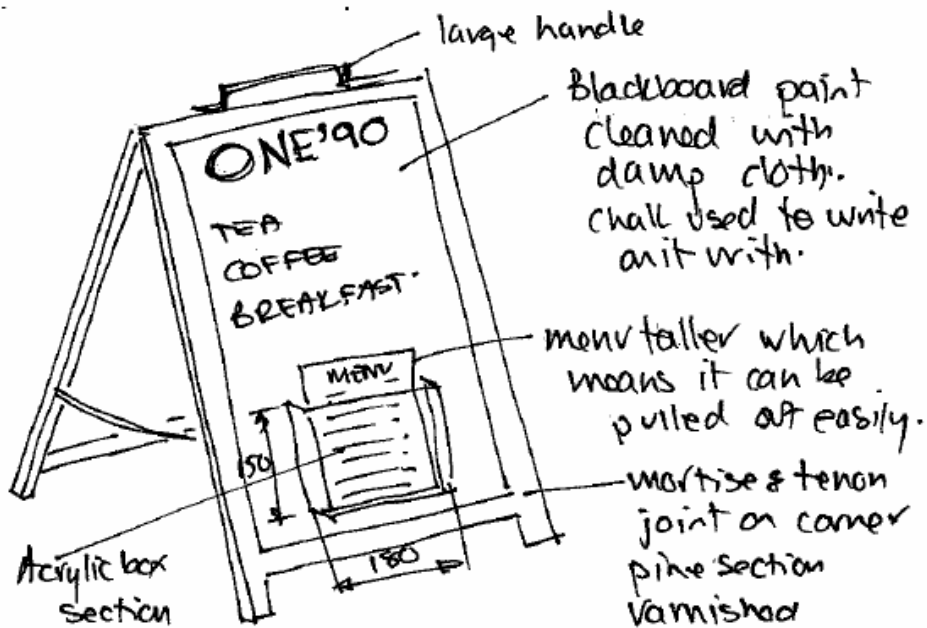
Question Number	Answer	Mark
Q02(a)	ABS (only answer)  <p style="text-align: right;">(2 x 1)</p>	(1)
Q02(b)(i)	Two other properties from: <ul style="list-style-type: none"> <li>• hard</li> <li>• durable</li> <li>• ductile</li> <li>• does not rust/corrode</li> <li>• good electrical conductor</li> <li>• malleable</li> </ul> <p><i>(Do not accept toughness/strong)</i></p> <p style="text-align: right;">(2 x 1)</p>	(2)
Q02(b)(ii)	Two reasons given from: <ul style="list-style-type: none"> <li>• will not wear away / long lasting</li> <li>• not easily dented/damaged</li> <li>• will not break / bend when pushed in / pulled out of the plug socket</li> <li>• can withstand the forces tension / compression / sudden shock</li> <li>• can push back the contact pins inside the socket</li> </ul> <p style="text-align: right;">(2 x 1)</p>	(2)
Q02(c)	Two reasons given from: <ul style="list-style-type: none"> <li>• makes it easier to grip/pull out</li> <li>• makes it safer to use</li> <li>• improves aesthetic appearance / makes it look better</li> <li>• to help blind people</li> </ul> <p style="text-align: right;">(2 x 1)</p>	(2)
Q02(d)(i)	Two properties given from: <ul style="list-style-type: none"> <li>• good electrical conductor</li> <li>• ductile / easily drawn into thin wires</li> <li>• easily bent/flexible</li> <li>• easily soldered</li> <li>• will not rust / corrode</li> <li>• easily clamped / gripped</li> </ul> <p style="text-align: right;">(2 x 1)</p>	(2)

Q02(d)(ii)	<p>One reason explained from:</p> <ul style="list-style-type: none"> <li>• The plastic material acts as an insulator and therefore protects against / stops any short circuits / electric shock injury / reduces fire hazard / makes it safe</li> <li>• Copper tarnishes / develops a surface oxide and therefore the plastic acts as a barrier against / stops it</li> <li>• Different colours are used to identify live/neutral/earth</li> </ul> <p style="text-align: right;">(2 x 1)</p>	(2)
Q02(e)	<p>Two benefits to the consumer given from:</p> <ul style="list-style-type: none"> <li>• product has met minimum safety standard</li> <li>• has been tested / met / passed safety standard tests / will be safe to use</li> <li>• gives consumer confidence in product / has a guarantee / enhanced product value</li> <li>• will be reliable / improved product reliability / less likely to break</li> </ul> <p style="text-align: right;">(2 x 1)</p>	(2)
Q02(f)	<p>Three advantages for the consumer given from:</p> <ul style="list-style-type: none"> <li>• product may be cheaper</li> <li>• new products will come to the market faster</li> <li>• more reliable products / greater quality control</li> <li>• greater product availability</li> </ul> <p><i>(Do not accept cheap/cheaper just on their own)</i></p> <p style="text-align: right;">(3 x 1)</p>	(3)
Q02(g)(i)	<p>Two other environmental issues from:</p> <ul style="list-style-type: none"> <li>• reusing/recycling materials / waste management / economic use of materials / conservation of resources</li> <li>• gas emissions during manufacture / fumes being given off / pollution</li> <li>• sustainable technology / materials</li> <li>• energy used during manufacturing processes</li> </ul> <p style="text-align: right;">(2 x 1)</p>	(2)
Q02(g)(ii)	<p>Two effects described from:</p> <ul style="list-style-type: none"> <li>• less waste to be disposed of which means land fill sites will last longer</li> <li>• less mining for new/virgin materials which means less destruction to the landscape</li> <li>• less energy required/energy is saved which means pollution reduced</li> </ul> <p style="text-align: right;">(2 x 1) (2 x 1)</p>	(4)
<b>Total Marks</b>		<b>22</b>



Question Number	Answer	Mark
Q03(a)	<p>Each point of the specification has two marking points.</p> <p><b>1 mark</b> should be awarded for evidence of each point of specification resolved in the design.  For each specification point with both elements viably satisfied <b>2 marks</b>.  For each specification point with only one element viably satisfied <b>1 marks</b>.  Where an answer does not viably answer a specification point <b>0 marks</b>.  Candidates may answer any specification point in either graphical form or by annotation.  <b>No marks are awarded for quality of communication.</b></p>	
	<p><b>DESIGN IDEA 1</b></p> <p><b>Specification point 1:</b> The advertising board must provide a surface which can be written on and wiped clean.</p> <p>Evidence given / shown that it provides a surface which can be written on  e.g. Dry wipe board / magic marker pens / chalk board (1)</p> <p>Evidence given / shown that it can be wiped clean  e.g. Damp cloth / dry wipe board eraser / chalk rubber / surface finish (1)  (2 x 1)</p> <p><b>Specification point 2:</b> The advertising board must be freestanding and portable.</p> <p>Evidence given / shown that it is freestanding  e.g. Large base area / wide area to stand open on / stable area (1)</p> <p>Evidence given / shown that it is portable  e.g. Wheels / carry handles / sandwich board / vest / placard (1)  (2 x 1)</p> <p><b>Specification point 3:</b> The advertising board must hold copies of a menu card that can be easily removed  Evidence given / shown that it can hold copies of a menu  e.g. Drawing pins / masking / sticky tape / plastic sleeve/ use of dimensions (1)  Evidence given / shown that it can be easily removed  e.g. Shelf / slots / behind panel / clear access / lids / peel off (1)  (2 x 1)</p> <p><b>Specification point 4:</b> The advertising board must be made using materials and processes suitable for one-off production.</p> <ul style="list-style-type: none"> <li>• Specific material named</li> <li>• Process given</li> </ul> <p>e.g. Jigs / templates / tools / process / machinery  (2 x 1)</p>	<p>(2)</p> <p>(2)</p> <p>(2)</p> <p>(2)</p> <p>(2)</p>

Possible graphical solution:



**DESIGN IDEA 2**

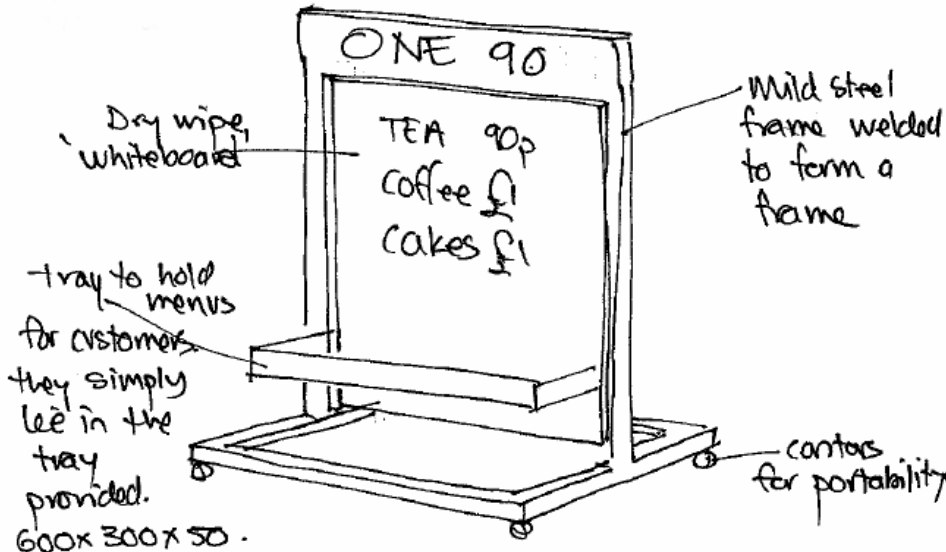
To score a mark for Design Idea 2, each specification point must be resolved again in the second design idea but the second design idea must be **technically / conceptually different in design and construction** from the first and not a simple variation on a theme to score the mark.

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

- A different surface to write on
- A different method used to wipe clean
- A different method of being freestanding
- A different method of making it portable
- A different method to holding a menu card
- A different method of being easily removed
- A different specific material named
- A different suitable process

(8 x 1)

(8)

	<p>Possible graphical solution:</p> 	
Q03(b)	<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) &amp; (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 <b>1 mark</b> for a correct evaluation / justification relating to each design feature and how it succeeds or fails</p> <p>Repetition of original spec scores 0 marks.</p>	
Q03(b)(i)	<p>The advertising board must provide a surface which can be written on and wiped clean:</p> <ul style="list-style-type: none"> <li>• Provision of surface</li> <li>• Ease of wiping clean</li> </ul>	<p>(2 x 1) (2)</p>
Q03(b)(ii)	<p>The advertising board must be freestanding and portable.</p> <ul style="list-style-type: none"> <li>• Freestanding</li> <li>• Portable</li> </ul>	<p>(2 x 1) (2)</p>
Q03(b)(iii)	<p>The advertising board must hold copies of a menu card that can be easily removed</p> <ul style="list-style-type: none"> <li>• Hold copies of a menu</li> <li>• Can be easily removed</li> </ul>	<p>(2 x 1) (2)</p>
<b>Total Marks</b>		<b>22</b>

Question Number	Answer	Mark
Q04	Three of the following: <ul style="list-style-type: none"> <li>• Specification points</li> <li>• Reasons</li> </ul> <i>(Do not accept repetition of the specification points)</i>	
Q04(a)(i)	<b>The needs of the user</b> <b>Point:</b> easy to refill <b>Reason:</b> so that it does not become too much of a problem to keep it topped up/ease of use  <b>Point:</b> easy for the birds to sit on <b>Reason:</b> so that you can see them easily  <b>Point:</b> be easy to site / position <b>Reason:</b> no tools required to put it into place / fix up  <b>Point:</b> durable materials <b>Reason:</b> so that it lasts a long time / low maintenance  <b>Point:</b> dome is clear/transparent <b>Reason:</b> so you can see when it needs to be refilled  <b>Point:</b> hold seed securely <b>Reason:</b> so it does not fall out/get wasted	(2 x 1) (2)
Q04(a)(ii)	<b>Environmental considerations</b> <b>Point:</b> use of recycled materials <b>Reason:</b> so existing materials / resources are preserved  <b>Point:</b> materials should recycled once the product has reached the end of its useful life <b>Reason:</b> so that the materials may be used for something else / preserving resources / reducing landfill / damaging environment  <b>Point:</b> used timber from managed forests <b>Reason:</b> to control deforestation / maintain climate environment	(2 x 1) (2)

Q04(a)(iii)	<p><b>Quality</b>  <b>Point:</b> smooth edges  <b>Reason:</b> so no injury is caused to the user</p> <p><b>Point:</b> accurate fitting of the refill plug  <b>Reason:</b> so it does not fall out and get lost</p> <p><b>Point:</b> the chain should be well fitted/secure/well made  <b>Reason:</b> so that it does not come loose/falls apart which results in the feeder falling from the tree</p> <p><b>Point:</b> materials suitable for exterior use  <b>Reason:</b> longer life span / greater reliability</p> <p><b>Point:</b> durable materials  <b>Reason:</b> so that it lasts a long time / low maintenance</p> <p><b>Point:</b> well finished  <b>Reason:</b> attracts buyers/improves weather resistance</p> <p>Some flexibility should be given as some points may cross over descriptions.</p> <p style="text-align: right;"><i>(do not accept/credit if already given in a(i))</i> (2 x 1)</p>	(2)
Q04(b)	<p>Two reasons given from:</p> <ul style="list-style-type: none"> <li>• readily available/faster growing</li> <li>• easily machined / cut / shaped / worked</li> <li>• can be finished in different ways / colours</li> <li>• relatively cheap</li> <li>• can come from a managed forest</li> <li>• natural material which blends into the situation/environment</li> <li>• it is a non-toxic material</li> </ul> <p><i>(Do not accept strong)</i></p> <p style="text-align: right;">(2 x 1)</p>	(2)
Q04(c)	<p>Two reasons given from</p> <ul style="list-style-type: none"> <li>• good surface finish / self finishing</li> <li>• no additional surface finishing required</li> <li>• suitable for mass / high volume production</li> <li>• repeatability / identical</li> <li>• many can be made in one mould</li> <li>• high tolerance / very accurate</li> <li>• colours can be changed</li> <li>• unit costs are low once mould has been paid for</li> <li>• can produce a complex form</li> </ul> <p><i>(Do not accept easy / quick / cheap / unless qualified)</i></p> <p style="text-align: right;">(2 x 1)</p>	(2)

Q04(d)	<p>Two properties and reasons given from:</p> <p><b>Property:</b> lightweight <b>Reason:</b> does not make it too heavy to lift</p> <p><b>Property:</b> toughness <b>Reason:</b> will stand up to knocks and bumps</p> <p><b>Property:</b> plasticity / easily moulded <b>Reason:</b> so it can be easily injection moulded / blow moulded / plug and yoke moulded</p> <p><b>Property:</b> durable / weatherproof / waterproof <b>Reason:</b> will withstand weathering / does not absorb water / will stand up against outside elements / bird pecking / seed will not get wet</p> <p><b>Property:</b> non-toxic <b>Reason:</b> will not cause any harm to the birds</p> <p><i>(Do not accept strong / anything related to colour/transparency)</i></p> <p style="text-align: right;">(2 x 1) (2 x 1)</p>	(4)
Q04(e)	<p>Two quality control checks given from:</p> <ul style="list-style-type: none"> <li>• correct size/ shape / dimensional accuracy / within tolerances</li> <li>• hole for refill plug is correct size / place</li> <li>• quality of edge finishing</li> <li>• no other holes/cracks in it</li> <li>• chain is held/ fixed securely</li> <li>• assembly is correct / bits put together properly</li> <li>• fully formed mouldings</li> <li>• timber is knot/split free</li> </ul> <p><i>(do not accept anything related to safety)</i></p> <p style="text-align: right;">(2 x 1)</p>	(2)
Q04(f)	<p>One description from:</p> <ul style="list-style-type: none"> <li>• flat simple shape which can be easily cut / held on a machine</li> <li>• no tight corners which might increase efficiency / take less time / reduce processing time</li> <li>• sweeping long curves which allow for the machine to cut at high speeds</li> </ul> <p><i>(Do not accept quicker / faster easier)</i></p> <p style="text-align: right;">(2 x 1)</p>	(2)

Q04(g)(i)	<p>Keep the bird seed dry One explanation from:</p> <ul style="list-style-type: none"> <li>• it is held inside the plastic storage dome/container which is waterproof / prevents the seed from getting wet</li> <li>• the shape of the dome means that the water runs off it rather than collecting on it and dripping through</li> <li>• has a plug in the refill hole which prevents water getting into the seed/dome</li> </ul> <p style="text-align: right;">(2 x 1)</p>	(2)
Q04(g)(ii)	<p>Prevent cats from getting at the feeding birds One explanation from:</p> <ul style="list-style-type: none"> <li>• It has a chain on it which means it can be hung safely in a tree on a branch</li> </ul> <p style="text-align: right;">(2 x 1)</p>	(2)
Total Marks		22
Total for paper		88

1973 2H Mark Scheme

Question Number	Answer	Mark
Q01	<p>Three of the following:</p> <ul style="list-style-type: none"> <li>• Specification points</li> <li>• Reasons</li> </ul> <p><i>(Do not accept repetition of the specification points)</i></p>	
Q01(a)(i)	<p>The needs of the user</p> <p>Point: easy to refill Reason: so that it does not become too much of a problem to keep it topped up/ease of use</p> <p>Point: easy for the birds to sit on Reason: so that you can see them easily</p> <p>Point: be easy to site / position Reason: no tools required to put it into place / fix up</p> <p>Point: durable materials Reason: so that it lasts a long time / low maintenance</p> <p>Point: dome is clear/transparent Reason: so you can see when it needs to be refilled</p> <p>Point: hold seed securely Reason: so it does not fall out/get wasted</p>	(2)
Q01(a)(ii)	<p>Environmental considerations</p> <p>Point: use of recycled materials Reason: so existing materials / resources are preserved</p> <p>Point: materials should recycled once the product has reached the end of its useful life Reason: so that the materials may be used for something else / preserving resources / reducing landfill / damaging environment</p> <p>Point: used timber from managed forests Reason: to control deforestation / maintain climate environment</p>	(2)



Q01(a)(iii)	<p><b>Quality</b>  <b>Point:</b> smooth edges  <b>Reason:</b> so no injury is caused to the user</p> <p><b>Point:</b> accurate fitting of the refill plug  <b>Reason:</b> so it does not fall out and get lost</p> <p><b>Point:</b> the chain should be well fitted/secure/well made  <b>Reason:</b> so that it does not come loose/falls apart which results in the feeder falling from the tree</p> <p><b>Point:</b> materials suitable for exterior use  <b>Reason:</b> longer life span / greater reliability</p> <p><b>Point:</b> durable materials  <b>Reason:</b> so that it lasts a long time / low maintenance</p> <p><b>Point:</b> well finished  <b>Reason:</b> attracts buyers/improves weather resistance</p> <p>Some flexibility should be given as some points may cross over descriptions.  <i>(do not accept/credit if already given in a(i))</i>  (2 x 1)</p>	(2)
Q01(b)	<p>Two reasons given from:</p> <ul style="list-style-type: none"> <li>• readily available/faster growing</li> <li>• easily machined / cut / shaped / worked</li> <li>• can be finished in different ways / colours</li> <li>• relatively cheap</li> <li>• can come from a managed forest</li> <li>• natural material which blends into the situation/environment</li> <li>• it is a non-toxic material</li> </ul> <p><i>(Do not accept strong)</i>  (2 x 1)</p>	(2)
Q01(c)	<p>Two reasons given from</p> <ul style="list-style-type: none"> <li>• good surface finish / self finishing</li> <li>• no additional surface finishing required</li> <li>• suitable for mass / high volume production</li> <li>• repeatability / identical</li> <li>• many can be made in one mould</li> <li>• high tolerance / very accurate</li> <li>• colours can be changed</li> <li>• unit costs are low once mould has been paid for</li> <li>• can produce a complex form</li> </ul> <p><i>(Do not accept easy / quick / cheap / unless qualified)</i>  (2 x 1)</p>	(2)

Q01(d)	<p>Two properties and reasons given from:</p> <p><b>Property:</b> lightweight <b>Reason:</b> does not make it too heavy to lift</p> <p><b>Property:</b> toughness <b>Reason:</b> will stand up to knocks and bumps</p> <p><b>Property:</b> plasticity / easily moulded <b>Reason:</b> so it can be easily injection moulded / blow moulded / plug and yoke moulded</p> <p><b>Property:</b> durable / weatherproof / waterproof <b>Reason:</b> will withstand weathering / does not absorb water / will stand up against outside elements / bird pecking / seed will not get wet</p> <p><b>Property:</b> non-toxic <b>Reason:</b> will not cause any harm to the birds</p> <p><i>(Do not accept strong / anything related to colour/transparency)</i></p> <p style="text-align: right;">(2 x 1) (2 x 1)</p>	(1)
Q01(e)	<p>Two quality control checks given from:</p> <ul style="list-style-type: none"> <li>• correct size/ shape / dimensional accuracy / within tolerances</li> <li>• hole for refill plug is correct size / place</li> <li>• quality of edge finishing</li> <li>• no other holes/cracks in it</li> <li>• chain is held/ fixed securely</li> <li>• assembly is correct / bits put together properly</li> <li>• fully formed mouldings</li> <li>• timber is knot/split free</li> </ul> <p><i>(do not accept anything related to safety)</i></p> <p style="text-align: right;">(2 x 1)</p>	(2)
Q01(f)	<p>One description from:</p> <ul style="list-style-type: none"> <li>• flat simple shape which can be easily cut / held on a machine</li> <li>• no tight corners which might increase efficiency / take less time / reduce processing time</li> <li>• sweeping long curves which allow for the machine to cut at high speeds</li> </ul> <p><i>(Do not accept quicker / faster easier)</i></p> <p style="text-align: right;">(2 x 1)</p>	(2)

Q01(g)(i)	<p>Keep the bird seed dry One explanation from:</p> <ul style="list-style-type: none"> <li>• it is held inside the plastic storage dome/container which is waterproof / prevents the seed from getting wet</li> <li>• the shape of the dome means that the water runs off it rather than collecting on it and dripping through</li> <li>• has a plug in the refill hole which prevents water getting into the seed/dome</li> </ul> <p style="text-align: right;">(2 x 1)</p>	(2)
Q01(g)(ii)	<p>Prevent cats from getting at the feeding birds One explanation from:</p> <ul style="list-style-type: none"> <li>• It has a chain on it which means it can be hung safely in a tree on a branch</li> </ul> <p style="text-align: right;">(2 x 1)</p>	(2)
<b>Total Marks</b>		<b>22</b>

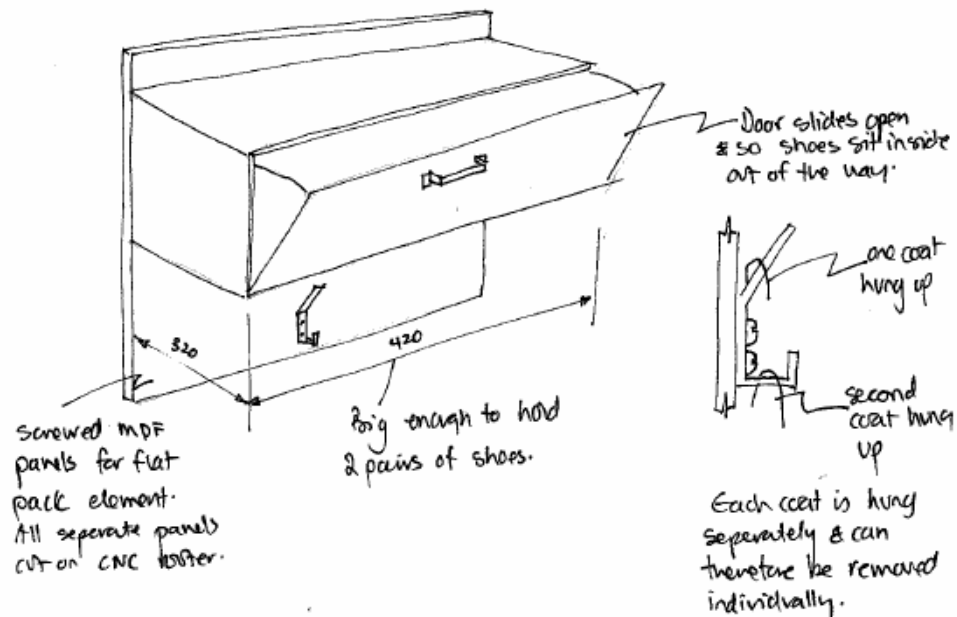
Question Number	Answer	Mark
Q02(a)	<p>Three risks given from:</p> <ul style="list-style-type: none"> <li>• Cuts to hands/fingers/clothing/personnel injury</li> <li>• Hitting hand with mallet/not holding chisel securely</li> <li>• Handle coming off/splitting/injury caused by the tang</li> <li>• Bits flying off/hitting others</li> </ul> <p><i>(do not accept workshop rules i.e. do not run/carry point down)</i></p> <p style="text-align: right;">(3 x 1)</p>	(3)
Q02(b)	<ul style="list-style-type: none"> <li>• Copper</li> <li>• Zinc</li> </ul> <p>(Only answers)</p> <p style="text-align: right;">(2 x 1)</p>	(2)
Q02(c)	<p>One process described from:</p> <ul style="list-style-type: none"> <li>• the steel blade is <b>heated up to a cherry red colour</b> and then <b>quenched</b></li> </ul> <p>If case hardening has been described accept:</p> <ul style="list-style-type: none"> <li>• the steel blade is <b>heated up</b> then <b>dipped into carbon/carburising powder</b></li> </ul> <p style="text-align: right;">(2 x 1)</p>	(2)
Q02(d)	<p>Two advantages explained from:</p> <ul style="list-style-type: none"> <li>• <b>High quality surface finish</b> can be achieved because of the <b>surface finish on the mould itself</b></li> <li>• <b>Blade is securely / safely fixed</b> because it is <b>moulded onto the handle</b></li> <li>• <b>Efficient use of raw materials</b> because <b>there is very little waste</b></li> <li>• <b>Consistent quality/identical/accurate</b> because of the <b>material properties/manufacturing process</b></li> <li>• <b>Speed of production is high/suited to mass production</b> because <b>injection moulding is a highly automated process</b></li> <li>• <b>Different sized blades can be fitted into the same sized handle</b> making it <b>cheaper in the long run (standard sized handles)</b></li> </ul> <p style="text-align: right;">(2 x 1) (2 X 1)</p>	(4)

Q02(e)	<p>Three ways given from:</p> <ul style="list-style-type: none"> <li>• Test ergonomics</li> <li>• Look at / evaluate different shapes</li> <li>• Rotate to see other side / view all round</li> <li>• Can be emailed/linked to rapid modelling system / output modelling direct</li> <li>• Different textures can be applied/colours</li> <li>• Shapes / sizes can be altered</li> <li>• Accurate / exact measurements can be achieved</li> <li>• Create 3D models</li> <li>• Easy to change/amend designs/shapes</li> <li>• Weight/mass calculations</li> </ul> <p><i>(Do not accept easier / faster)</i></p> <p style="text-align: right;">(3 x 1)</p>	(3)
Q02(f)(i)	<p>Two ways described from:</p> <ul style="list-style-type: none"> <li>• Databases can be used to hold information about materials / stock items / components / production progress</li> <li>• Spreadsheets can be used to hold information about accounts / financial / staff records</li> <li>• E-mail can be used for fast communication with suppliers / retailers</li> <li>• Fax machines linked to computers can be used to send documents any where in the world</li> <li>• EPOS systems can be used for collecting sales information data</li> <li>• The internet can be used for advertising new products and services / banking / payroll</li> <li>• Blackberries / iPhone / mobile phone can be used to access information</li> <li>• Organisational software allows you to timetable/schedule meetings</li> </ul> <p style="text-align: right;">(2 x 1) (2 x 1)</p>	(4)
Q02(f)(ii)	<p>Two advantages explained from:</p> <ul style="list-style-type: none"> <li>• Allows communication between different departments which reduces lead times</li> <li>• Project management software enables faster production</li> <li>• Manufacturing cells can be re-programmed therefore responding to customer needs</li> <li>• Automatic storage retrieval systems (ASRS) ensures resources are available where / when required</li> <li>• One team involved in design of project which allows instant feedback / modifications</li> <li>• Stocks of materials / components can be carefully controlled / managed / JIT which means money is not tied up / no excess stock</li> <li>• Fewer workers required to control stock/speed up production</li> </ul> <p style="text-align: right;">(2 x 1) (2 x 1)</p>	(4)
<b>Total Marks</b>		<b>22</b>

Question Number	Answer	Mark
Q03(a)	<p>Each point of the specification has two marking points.</p> <p><b>1 mark</b> should be awarded for evidence of each point of specification resolved in the design.  For each specification point with both elements viably satisfied <b>2 marks</b>.  For each specification point with only one element viably satisfied <b>1 marks</b>.  Where an answer does not viably answer a specification point <b>0 marks</b>.  Candidates may answer any specification point in either graphical form or by annotation.  <b>No marks are awarded for quality of communication.</b></p>	
	<p><b>DESIGN IDEA 1</b></p> <p><b>Specification point 1:</b> The hallway storage unit must provide a method to hang up two coats that allows them to be individually removed</p> <p>Evidence given / shown that it provides a method to hang up to two coats  e.g. Hooks / pegs / poll</p> <p>Evidence given / allows them to be individually removed  e.g. Side by side / one peg above another</p> <p style="text-align: right;">(2 x 1)</p> <p style="text-align: right;">(2)</p> <p><b>Specification point 2:</b> The hallway storage unit must store two pairs of shoes without being able to see them</p> <p>Evidence given / shown that it stores two pairs of shoes  e.g. Use of dimensions / space shown / dimensioned</p> <p>Evidence given / shown that it can hold them without seeing them  e.g. Drawers / fold down flaps / use of baskets / trays</p> <p style="text-align: right;">(2 x 1)</p> <p style="text-align: right;">(2)</p> <p><b>Specification point 3:</b> The hallway storage unit must be flat packed and assembled using only a screwdriver</p> <p>Evidence given / shown that it is flat packed  e.g. Use of knock down fittings / screws / cam locks</p> <p>Evidence given / shown that it can assembled using only a screwdriver  e.g. Dowel and cam lock / screws (<i>only accept one type of screw head</i>) / KD fittings</p> <p style="text-align: right;">(2 x 1)</p> <p style="text-align: right;">(2)</p> <p><b>Specification point 4:</b> The hallway storage unit must be made using materials and processes suitable for batch production</p> <ul style="list-style-type: none"> <li>• Specific material named</li> <li>• Process given</li> </ul> <p>e.g. Jigs / templates / tools / process / machinery</p> <p style="text-align: right;">(2 x 1)</p> <p style="text-align: right;">(2)</p>	

Possible graphical solution:

Design Idea 1



**DESIGN IDEA 2**

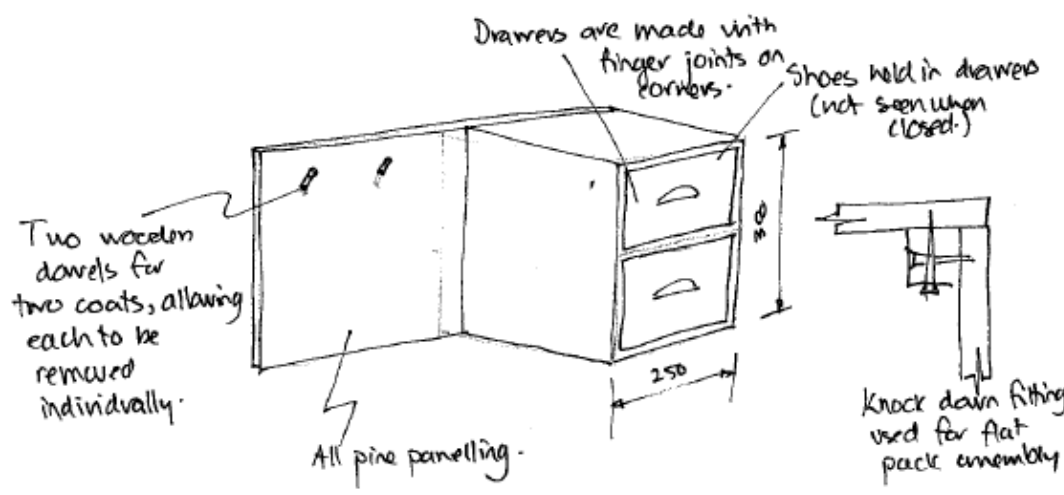
To score a mark for Design Idea 2, each specification point must be resolved again in the second design idea but the second design idea must be **technically / conceptually different in design and construction** from the first and not a simple variation on a theme to score the mark.

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

- A different method of holding the two coats
- A different method that allows them to be individually removed
- A different method of storing the two pairs of shoes
- A different method of making them not visible
- A different method of flat pack
- A different method of being assembled using only a screwdriver
- A different specific material named
- A different suitable process

(8 x 1)

(8)

	<p>Possible graphical solution:</p> 	
Q03(b)	<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) &amp; (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 marks.</p>	
Q03(b)(i)	<p>The hallway storage unit must provide a method to hang up two coats allows them to be individually removed</p> <ul style="list-style-type: none"> <li>• Provision to hang up two coats</li> <li>• Allows them to be individually removed</li> </ul> <p style="text-align: right;">(2 x 1)</p>	(2)
Q03(b)(ii)	<p>The hallway storage unit must store two pairs of shoes without being able to see them.</p> <ul style="list-style-type: none"> <li>• Provision to store two pairs of shoes</li> <li>• They must not be visible</li> </ul> <p style="text-align: right;">(2 x 1)</p>	(2)
Q03(b)(iii)	<p>The hallway storage unit must be flat packed and assembled using only a screwdriver</p> <ul style="list-style-type: none"> <li>• How it is flat packed</li> <li>• How it is assembled with only the use of a screwdriver</li> </ul> <p style="text-align: right;">(2 x 1)</p>	(2)
<b>Total Marks</b>		<b>22</b>



Question Number	Answer	Mark
Q04(a)	<p>Two properties given and a reason from:</p> <p><b>Property:</b> waterproof / water resistance  <b>Reason:</b> so that no water can get through the material onto the electronic components / so that it can withstand the elements</p> <p><b>Property:</b> tough / toughness  <b>Reason:</b> so that if it gets dropped it will not break</p> <p><b>Property:</b> shatter resistance  <b>Reason:</b> protects contents</p> <p><b>Property:</b> durable / does not erode  <b>Reason:</b> so that it withstands wear and tear / no surface deterioration/fading</p> <p><b>Property:</b> plasticity  <b>Reason:</b> so that it can be injection moulded / squeezed into the mould</p> <p><b>Property:</b> lightweight  <b>Reason:</b> so that it is not too heavy to carry around</p> <p><b>Property:</b> electrical insulator  <b>Reason:</b> so that there is no electrical damage</p> <p><i>(Do not accept hard / strong)</i></p> <p style="text-align: right;">(2 x 1) (2 x 1)</p>	(4)
Q04(b)	<p>Three working characteristics given from:</p> <ul style="list-style-type: none"> <li>• Easily moulded/shaped</li> <li>• They are recyclable</li> <li>• They have a memory / can return to their original shape</li> <li>• They are soft / easily scratched</li> <li>• They are flexible / have long tangled chains</li> <li>• Water resistant</li> <li>• Can be reheated/reshaped</li> </ul> <p><i>(Do not accept any answers relating to thermosetting plastics)</i></p> <p style="text-align: right;">(3 x 1)</p>	(3)
Q04(c)	<p>One disadvantage explained from:</p> <ul style="list-style-type: none"> <li>• It is <b>too brittle</b> and therefore <b>would crack / snap</b> if it were dropped</li> <li>• It is <b>very stiff</b> and therefore it is <b>less likely to bend / flex</b> if it were dropped / squashed</li> <li>• It is <b>easily scratched</b> and would therefore <b>very quickly lose its aesthetic appeal / appearance</b></li> <li>• <b>Not as tough</b> therefore <b>will not withstand shocks/dropping</b></li> </ul> <p style="text-align: right;">(2 x 1)</p>	(2)

Q04(d)	<p>One reason explained from:</p> <ul style="list-style-type: none"> <li>• It is more easily pressed / formed into shape because it is softer / requires less mechanical force to deform it</li> <li>• ferrous metals contain iron and will therefore rust / corrode in air / if they get wet</li> <li>• it is easier to soft solder to copper because of the lower temperatures involved</li> <li>• Non ferrous metals generally have better electrical conductors which make them more efficient</li> </ul> <p style="text-align: right;">(2 x 1)</p>	(2)
Q04(e)	<p>Three advantages given from:</p> <ul style="list-style-type: none"> <li>• Less demand on resources / less trees being cut down / less deforestation / loss of habitats</li> <li>• Reduced amount of waste being dumped into landfill sites</li> <li>• Less pollution caused / created in the production of new materials</li> <li>• Less waste having to be incinerated</li> <li>• Less energy consumed</li> </ul> <p style="text-align: right;">(3 x 1)</p>	(3)
Q04(f)	<p>Two benefits described from:</p> <ul style="list-style-type: none"> <li>• Batteries can be reused rather than having to dispose of them</li> <li>• Less long term damage to land / environment if they are recharged rather than thrown away in landfill</li> <li>• Less demand on raw materials to make new batteries and therefore resources are conserved</li> <li>• Less/fewer batteries made which means resources/energy conserved / pollution created</li> </ul> <p><i>(Do not accept can be recharged)</i></p> <p style="text-align: right;">(2 x 1) (2 x 1)</p>	(4)

Q04(g)	<p>Two reasons explained from:</p> <ul style="list-style-type: none"> <li>• Items get thrown away because consumers do not think that their contribution will make a difference / people are too lazy / not aware that items can be recycled / can't get to recycling centre / local councils do not provide enough sites / facilities for recycling / no incentive.</li> <li>• People do not have space to save the recycling for regular collections because of lack of frequent collections</li> <li>• Having to sort the waste out into different types sometimes takes too much time</li> <li>• Some people are not aware that items can be recycled / separated for recycling because of lack of information</li> <li>• Some materials are not collected because some councils do not have contracts / facilities to recycle them.</li> <li>• Some materials/items cannot be recycled/too expensive to recycle so they are simply thrown away</li> </ul> <p style="text-align: right;">(2 x 1) (2 x 1)</p>	(4)
	Total Marks	22
	Total for paper	88

3973 2F Mark Scheme

Question Number	Answer	Mark
Q01(a)	<p>Name: Vice <i>Do not accept clamp</i> Use: Holding/ clamping / securing work</p> <p>Name: Gauntlets / gloves Use: Holding hot things / protecting/stop burning your hands / handling sharp materials</p> <p>Name: Camera Use: Taking/capturing/storing photographs / video / images</p> <p style="text-align: right;">(6 x 1)</p>	(6)
Q01(b)(i)	<p>Stain (only answer)</p> <p style="text-align: right;">(1 x 1)</p>	(1)
Q01(b)(ii)	<p>One reason given from:</p> <ul style="list-style-type: none"> <li>• to stop it going hard / stiff / bristles sticking together</li> <li>• so it can be used again</li> <li>• to remove paint/varnish</li> <li>• so the colour does not come out/run when used again / spread / contaminate</li> </ul> <p style="text-align: right;">(1 x 1)</p>	(1)
Q01(b)(iii)	<p>Two reasons given from:</p> <ul style="list-style-type: none"> <li>• make it look nicer / improve aesthetic appeal</li> <li>• fit in with colours of product range / company colours</li> <li>• easier to keep clean / protect the surface</li> <li>• improve durability</li> <li>• sweat from hands will not effect the timber</li> </ul> <p style="text-align: right;">(2 x 1)</p>	(2)
Q01(c)	<p>One reason given from:</p> <ul style="list-style-type: none"> <li>• does not need / require any secondary finishing</li> <li>• speeds up production time / faster</li> <li>• can result in a smooth finish on the brush handle</li> <li>• requires less labour / contact</li> </ul> <p><i>(Do not accept easier/cheaper)</i></p> <p style="text-align: right;">(1 x 1)</p>	(1)
	<b>Mark Total</b>	<b>11</b>

Question Number	Answer	Mark
Q02(a)	ABS (only answer)  <p style="text-align: right;">(2 x 1)</p>	(1)
Q02(b)(i)	Two other properties from: <ul style="list-style-type: none"><li>• hard</li><li>• durable</li><li>• ductile</li><li>• does not rust/corrode</li><li>• good electrical conductor</li><li>• malleable</li></ul> <p><i>(Do not accept toughness/strong)</i></p> <p style="text-align: right;">(2 x 1)</p>	(2)
Q02(b)(ii)	Two reasons given from: <ul style="list-style-type: none"><li>• will not wear away / long lasting</li><li>• not easily dented/damaged</li><li>• will not break / bend when pushed in / pulled out of the plug socket</li><li>• can withstand the forces tension / compression / sudden shock</li><li>• can push back the contact pins inside the socket</li></ul> <p style="text-align: right;">(2 x 1)</p>	(2)
Q02(c)	Two reasons given from: <ul style="list-style-type: none"><li>• makes it easier to grip/pull out</li><li>• makes it safer to use</li><li>• improves aesthetic appearance / makes it look better</li><li>• to help blind people</li></ul> <p style="text-align: right;">(2 x 1)</p>	(2)
Q02(d)(i)	Two properties given from: <ul style="list-style-type: none"><li>• good electrical conductor</li><li>• ductile / easily drawn into thin wires</li><li>• easily bent/flexible</li><li>• easily soldered</li><li>• will not rust / corrode</li><li>• easily clamped / gripped</li></ul> <p style="text-align: right;">(2 x 1)</p>	(2)

Q02(d)(ii)	<p>One reason explained from:</p> <ul style="list-style-type: none"> <li>• The plastic material acts as an insulator and therefore protects against / stops any short circuits / electric shock injury / reduces fire hazard / makes it safe</li> <li>• Copper tarnishes / develops a surface oxide and therefore the plastic acts as a barrier against / stops it</li> <li>• Different colours are used to identify live/neutral/earth</li> </ul> <p style="text-align: right;">(2 x 1)</p>	(2)
<b>Total Marks</b>		<b>11</b>

Question Number	Answer	Mark
Q03	<p>Three of the following:</p> <ul style="list-style-type: none"> <li>• Specification points</li> <li>• Reasons</li> </ul> <p><i>(Do not accept repetition of the specification points)</i></p>	
Q03(a)(i)	<p><b>The needs of the user</b>  <b>Point:</b> easy to refill  <b>Reason:</b> so that it does not become too much of a problem to keep it topped up/ease of use</p> <p><b>Point:</b> easy for the birds to sit on  <b>Reason:</b> so that you can see them easily</p> <p><b>Point:</b> be easy to site / position  <b>Reason:</b> no tools required to put it into place / fix up</p> <p><b>Point:</b> durable materials  <b>Reason:</b> so that it lasts a long time / low maintenance</p> <p><b>Point:</b> dome is clear/transparent  <b>Reason:</b> so you can see when it needs to be refilled</p> <p><b>Point:</b> hold seed securely  <b>Reason:</b> so it does not fall out/get wasted</p>	
Q03(a)(ii)	<p><b>Environmental considerations</b>  <b>Point:</b> use of recycled materials  <b>Reason:</b> so existing materials / resources are preserved</p> <p><b>Point:</b> materials should recycled once the product has reached the end of its useful life  <b>Reason:</b> so that the materials may be used for something else / preserving resources / reducing landfill / damaging environment</p> <p><b>Point:</b> used timber from managed forests  <b>Reason:</b> to control deforestation / maintain climate environment</p>	<p style="text-align: right;">(2 x 1)      (2)</p> <p style="text-align: right;">(2 x 1)      (2)</p>

Q03(a)(iii)	<p>Quality</p> <p>Point: smooth edges Reason: so no injury is caused to the user</p> <p>Point: accurate fitting of the refill plug Reason: so it does not fall out and get lost</p> <p>Point: the chain should be well fitted/secure/well made Reason: so that it does not come loose/falls apart which results in the feeder falling from the tree</p> <p>Point: materials suitable for exterior use Reason: longer life span / greater reliability</p> <p>Point: durable materials Reason: so that it lasts a long time / low maintenance</p> <p>Point: well finished Reason: attracts buyers/improves weather resistance</p> <p>Some flexibility should be given as some points may cross over descriptions.</p> <p style="text-align: right;"><i>(do not accept/credit if already given in a(i))</i> (2 x 1)</p>	(2)
Q03(b)	<p>Two reasons given from:</p> <ul style="list-style-type: none"> <li>• readily available/faster growing</li> <li>• easily machined / cut / shaped / worked</li> <li>• can be finished in different ways / colours</li> <li>• relatively cheap</li> <li>• can come from a managed forest</li> <li>• natural material which blends into the situation/environment</li> <li>• it is a non-toxic material</li> </ul> <p><i>(Do not accept strong)</i></p> <p style="text-align: right;">(2 x 1)</p>	(2)
Q03(c)	<p>Two reasons given from</p> <ul style="list-style-type: none"> <li>• good surface finish / self finishing</li> <li>• no additional surface finishing required</li> <li>• suitable for mass / high volume production</li> <li>• repeatability / identical</li> <li>• many can be made in one mould</li> <li>• high tolerance / very accurate</li> <li>• colours can be changed</li> <li>• unit costs are low once mould has been paid for</li> <li>• can produce a complex form</li> </ul> <p><i>(Do not accept easy / quick / cheap / unless qualified)</i></p> <p style="text-align: right;">(2 x 1)</p>	(2)



Q03(d)	<p>Two properties and reasons given from:</p> <p><b>Property:</b> lightweight <b>Reason:</b> does not make it too heavy to lift</p> <p><b>Property:</b> toughness <b>Reason:</b> will stand up to knocks and bumps</p> <p><b>Property:</b> plasticity / easily moulded <b>Reason:</b> so it can be easily injection moulded / blow moulded / plug and yoke moulded</p> <p><b>Property:</b> durable / weatherproof / waterproof <b>Reason:</b> will withstand weathering / does not absorb water / will stand up against outside elements / bird pecking / seed will not get wet</p> <p><b>Property:</b> non-toxic <b>Reason:</b> will not cause any harm to the birds</p> <p><i>(Do not accept strong / anything related to colour/transparency)</i></p> <p style="text-align: right;">(2 x 1) (2 x 1)</p>	(3)
Q03(e)	<p>Two quality control checks given from:</p> <ul style="list-style-type: none"> <li>• correct size/ shape / dimensional accuracy / within tolerances</li> <li>• hole for refill plug is correct size / place</li> <li>• quality of edge finishing</li> <li>• no other holes/cracks in it</li> <li>• chain is held/ fixed securely</li> <li>• assembly is correct / bits put together properly</li> <li>• fully formed mouldings</li> <li>• timber is knot/split free</li> </ul> <p><i>(do not accept anything related to safety)</i></p> <p style="text-align: right;">(2 x 1)</p>	(2)
Q03(f)	<p>One description from:</p> <ul style="list-style-type: none"> <li>• flat simple shape which can be easily cut / held on a machine</li> <li>• no tight corners which might increase efficiency / take less time / reduce processing time</li> <li>• sweeping long curves which allow for the machine to cut at high speeds</li> </ul> <p><i>(Do not accept quicker / faster easier)</i></p> <p style="text-align: right;">(2 x 1)</p>	(2)

Q03(g)(i)	<p>Keep the bird seed dry One explanation from:</p> <ul style="list-style-type: none"> <li>• it is held inside the plastic storage dome/container which is waterproof / prevents the seed from getting wet</li> <li>• the shape of the dome means that the water runs off it rather than collecting on it and dripping through</li> <li>• has a plug in the refill hole which prevents water getting into the seed/dome</li> </ul> <p style="text-align: right;">(2 x 1)</p>	(2)
Q03(g)(ii)	<p>Prevent cats from getting at the feeding birds One explanation from:</p> <ul style="list-style-type: none"> <li>• It has a chain on it which means it can be hung safely in a tree on a branch</li> </ul> <p style="text-align: right;">(2 x 1)</p>	(2)
Total Marks		22
Total for paper		44

3973 2H Mark Scheme

Question Number	Answer	Mark
Q01	<p>Three of the following:</p> <ul style="list-style-type: none"> <li>• Specification points</li> <li>• Reasons</li> </ul> <p><i>(Do not accept repetition of the specification points)</i></p>	
Q01(a)(i)	<p>The needs of the user</p> <p>Point: easy to refill Reason: so that it does not become too much of a problem to keep it topped up/ease of use</p> <p>Point: easy for the birds to sit on Reason: so that you can see them easily</p> <p>Point: be easy to site / position Reason: no tools required to put it into place / fix up</p> <p>Point: durable materials Reason: so that it lasts a long time / low maintenance</p> <p>Point: dome is clear/transparent Reason: so you can see when it needs to be refilled</p> <p>Point: hold seed securely Reason: so it does not fall out/get wasted</p>	(2)
Q01(a)(ii)	<p>Environmental considerations</p> <p>Point: use of recycled materials Reason: so existing materials / resources are preserved</p> <p>Point: materials should recycled once the product has reached the end of its useful life Reason: so that the materials may be used for something else / preserving resources / reducing landfill / damaging environment</p> <p>Point: used timber from managed forests Reason: to control deforestation / maintain climate environment</p>	(2)

Q01(a)(iii)	<p>Quality</p> <p>Point: smooth edges Reason: so no injury is caused to the user</p> <p>Point: accurate fitting of the refill plug Reason: so it does not fall out and get lost</p> <p>Point: the chain should be well fitted/secure/well made Reason: so that it does not come loose/falls apart which results in the feeder falling from the tree</p> <p>Point: materials suitable for exterior use Reason: longer life span / greater reliability</p> <p>Point: durable materials Reason: so that it lasts a long time / low maintenance</p> <p>Point: well finished Reason: attracts buyers/improves weather resistance</p> <p>Some flexibility should be given as some points may cross over descriptions.</p> <p style="text-align: right;"><i>(do not accept/credit if already given in a(i))</i> (2 x 1)</p>	(2)
Q01(b)	<p>Two reasons given from:</p> <ul style="list-style-type: none"> <li>• readily available/faster growing</li> <li>• easily machined / cut / shaped / worked</li> <li>• can be finished in different ways / colours</li> <li>• relatively cheap</li> <li>• can come from a managed forest</li> <li>• natural material which blends into the situation/environment</li> <li>• it is a non-toxic material</li> </ul> <p><i>(Do not accept strong)</i></p> <p style="text-align: right;">(2 x 1)</p>	(2)
Q01(c)	<p>Two reasons given from</p> <ul style="list-style-type: none"> <li>• good surface finish / self finishing</li> <li>• no additional surface finishing required</li> <li>• suitable for mass / high volume production</li> <li>• repeatability / identical</li> <li>• many can be made in one mould</li> <li>• high tolerance / very accurate</li> <li>• colours can be changed</li> <li>• unit costs are low once mould has been paid for</li> <li>• can produce a complex form</li> </ul> <p><i>(Do not accept easy / quick / cheap / unless qualified)</i></p> <p style="text-align: right;">(2 x 1)</p>	(2)

Q01(d)	<p>Two properties and reasons given from:</p> <p><b>Property:</b> lightweight <b>Reason:</b> does not make it too heavy to lift</p> <p><b>Property:</b> toughness <b>Reason:</b> will stand up to knocks and bumps</p> <p><b>Property:</b> plasticity / easily moulded <b>Reason:</b> so it can be easily injection moulded / blow moulded / plug and yoke moulded</p> <p><b>Property:</b> durable / weatherproof / waterproof <b>Reason:</b> will withstand weathering / does not absorb water / will stand up against outside elements / bird pecking / seed will not get wet</p> <p><b>Property:</b> non-toxic <b>Reason:</b> will not cause any harm to the birds</p> <p><i>(Do not accept strong / anything related to colour/transparency)</i></p> <p style="text-align: right;">(2 x 1) (2 x 1)</p>	(1)
Q01(e)	<p>Two quality control checks given from:</p> <ul style="list-style-type: none"> <li>• correct size/ shape / dimensional accuracy / within tolerances</li> <li>• hole for refill plug is correct size / place</li> <li>• quality of edge finishing</li> <li>• no other holes/cracks in it</li> <li>• chain is held/ fixed securely</li> <li>• assembly is correct / bits put together properly</li> <li>• fully formed mouldings</li> <li>• timber is knot/split free</li> </ul> <p><i>(do not accept anything related to safety)</i></p> <p style="text-align: right;">(2 x 1)</p>	(2)
Q01(f)	<p>One description from:</p> <ul style="list-style-type: none"> <li>• flat simple shape which can be easily cut / held on a machine</li> <li>• no tight corners which might increase efficiency / take less time / reduce processing time</li> <li>• sweeping long curves which allow for the machine to cut at high speeds</li> </ul> <p><i>(Do not accept quicker / faster easier)</i></p> <p style="text-align: right;">(2 x 1)</p>	(2)

Q01(g)(i)	<p>Keep the bird seed dry One explanation from:</p> <ul style="list-style-type: none"> <li>• it is held inside the plastic storage dome/container which is waterproof / prevents the seed from getting wet</li> <li>• the shape of the dome means that the water runs off it rather than collecting on it and dripping through</li> <li>• has a plug in the refill hole which prevents water getting into the seed/dome</li> </ul> <p style="text-align: right;">(2 x 1)</p>	(2)
Q01(g)(ii)	<p>Prevent cats from getting at the feeding birds One explanation from:</p> <ul style="list-style-type: none"> <li>• It has a chain on it which means it can be hung safely in a tree on a branch</li> </ul> <p style="text-align: right;">(2 x 1)</p>	(2)
<b>Total Marks</b>		<b>22</b>

Question Number	Answer	Mark
Q02(a)	<p>Three risks given from:</p> <ul style="list-style-type: none"> <li>Cuts to hands/fingers/clothing/personnel injury</li> <li>Hitting hand with mallet/not holding chisel securely</li> <li>Handle coming off/splitting/injury caused by the tang</li> <li>Bits flying off/hitting others</li> </ul> <p><i>(do not accept workshop rules i.e. do not run/carry point down)</i></p> <p style="text-align: right;">(3 x 1)</p>	(3)
Q02(b)	<ul style="list-style-type: none"> <li>Copper</li> <li>Zinc</li> </ul> <p>(Only answers)</p> <p style="text-align: right;">(2 x 1)</p>	(2)
Q02(c)	<p>One process described from:</p> <ul style="list-style-type: none"> <li>the steel blade is <b>heated up to a cherry red colour</b> and then <b>quenched</b></li> </ul> <p>If case hardening has been described accept:</p> <ul style="list-style-type: none"> <li>the steel blade is <b>heated up</b> then <b>dipped into carbon/carburising powder</b></li> </ul> <p style="text-align: right;">(2 x 1)</p>	(2)
Q02(d)	<p>Two advantages explained from:</p> <ul style="list-style-type: none"> <li>High quality surface finish can be achieved because of the surface finish on the mould itself</li> <li>Blade is securely / safely fixed because it is moulded onto the handle</li> <li>Efficient use of raw materials because there is very little waste</li> <li>Consistent quality/identical/accurate because of the material properties/manufacturing process</li> <li>Speed of production is high/suited to mass production because injection moulding is a highly automated process</li> <li>Different sized blades can be fitted into the same sized handle making it cheaper in the long run (standard sized handles)</li> </ul> <p style="text-align: right;">(2 x 1) (2 X 1)</p>	(4)
<b>Total Marks</b>		<b>11</b>

Question Number	Answer	Mark
Q03(a)	<p>Two properties given and a reason from:</p> <p><b>Property:</b> waterproof / water resistance  <b>Reason:</b> so that no water can get through the material onto the electronic components / so that it can withstand the elements</p> <p><b>Property:</b> tough / toughness  <b>Reason:</b> so that if it gets dropped it will not break</p> <p><b>Property:</b> shatter resistance  <b>Reason:</b> protects contents</p> <p><b>Property:</b> durable / does not erode  <b>Reason:</b> so that it withstands wear and tear / no surface deterioration/fading</p> <p><b>Property:</b> plasticity  <b>Reason:</b> so that it can be injection moulded / squeezed into the mould</p> <p><b>Property:</b> lightweight  <b>Reason:</b> so that it is not too heavy to carry around</p> <p><b>Property:</b> electrical insulator  <b>Reason:</b> so that there is no electrical damage</p> <p><i>(Do not accept hard / strong)</i></p> <p style="text-align: right;">(2 x 1) (2 x 1)</p>	(4)
Q03(b)	<p>Three working characteristics given from:</p> <ul style="list-style-type: none"> <li>• Easily moulded/shaped</li> <li>• They are recyclable</li> <li>• They have a memory / can return to their original shape</li> <li>• They are soft / easily scratched</li> <li>• They are flexible / have long tangled chains</li> <li>• Water resistant</li> <li>• Can be reheated/reshaped</li> </ul> <p><i>(Do not accept any answers relating to thermosetting plastics)</i></p> <p style="text-align: right;">(3 x 1)</p>	(3)
Q03(c)	<p>One disadvantage explained from:</p> <ul style="list-style-type: none"> <li>• It is <b>too brittle</b> and therefore <b>would crack / snap</b> if it were <b>dropped</b></li> <li>• It is <b>very stiff</b> and therefore it is <b>less likely to bend / flex</b> if it were <b>dropped / squashed</b></li> <li>• It is <b>easily scratched</b> and would therefore <b>very quickly lose its aesthetic appeal / appearance</b></li> <li>• <b>Not as tough</b> therefore <b>will not withstand shocks/dropping</b></li> </ul> <p style="text-align: right;">(2 x 1)</p>	(2)



Q03(d)	<p>One reason explained from:</p> <ul style="list-style-type: none"> <li>• It is more easily pressed / formed into shape because it is softer / requires less mechanical force to deform it</li> <li>• ferrous metals contain iron and will therefore rust / corrode in air / if they get wet</li> <li>• it is easier to soft solder to copper because of the lower temperatures involved</li> <li>• Non ferrous metals generally have better electrical conductors which make them more efficient</li> </ul> <p style="text-align: right;">(2 x 1)</p>	(2)
	Total Marks	11
	Total for paper	44





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