

Mark Scheme (Results)

Summer 2015

Pearson Edexcel
GCSE Design & Technology: Resistant
Materials
5RM02/01

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General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

Question Number	Answer	Mark
1	D No alternatives	(1)
Question Number	Answer	Mark
2	A No alternatives	(1)
Question Number	Answer	Mark
3	D No alternatives	(1)
Question Number	Answer	Mark
4	D No alternatives	(1)
Question Number	Answer	Mark
5	C No alternatives	(1)
Question Number	Answer	Mark
6	A No alternatives	(1)
Question Number	Answer	Mark
7	C No alternatives	(1)
Question Number	Answer	Mark
8	B No alternatives	(1)
Question Number	Answer	Mark
9	B No alternatives	(1)
Question Number	Answer	Mark
10	C No alternatives	(1)

Question Number	Answer	Mark
11. (a)	Name <ul style="list-style-type: none"> • Tape measure / measuring tape / tape (only answers) <p style="text-align: right;">(1)</p>	(4)
	Name <ul style="list-style-type: none"> • Hole saw / tank cutter (accept spelling of whole) (only answers) <p style="text-align: right;">(1)</p>	
	Use <ul style="list-style-type: none"> • To make an indent/dent / guide / locate / mark where you want to drill a hole / scribe a circle / arc • To stop the drill skidding/ sliding/wandering when drilling a hole • For marking out a centre (Do not accept anything related to making / marking / punching holes / marking out a hole) <p style="text-align: right;">(1)</p>	
	Name <ul style="list-style-type: none"> • Block plane (only answers) <p style="text-align: right;">(1)</p>	

Question Number	Answer	Mark
11. (b) (i)	<ul style="list-style-type: none"> • Hard board (1) (only answer) <p style="text-align: right;">1 x 1</p>	(1)

Question Number	Answer	Mark
11. (b) (ii)	<ul style="list-style-type: none"> • Plywood / ply (1) (only answer) <p style="text-align: right;">1 x 1</p>	(1)

Question Number	Answer	Mark
11.(b) (iii)	<ul style="list-style-type: none"> • PVA / polyvinyl acetate (1) (only answer) <p style="text-align: right;">1 x 1</p>	(1)

Question Number	Answer	Mark
11.(c) (i)	<p>Two issues given from:</p> <ul style="list-style-type: none"> • Fumes given off/ inhalation / use of extractor (1) • Skin burns / burns from laser (1) • Damage to eyes / blindness / arc eye (1) • Materials wood / card / paper / fabric can catch fire / burn (1) • Keep the lid closed to retain fumes / stop potential burns (1) • Personal injury in the form of burns from hot materials / MDF / Ply (1) <p>(Do not accept answers related to use of gloves or goggles)</p> <p style="text-align: right;">2 x 1</p>	(2)

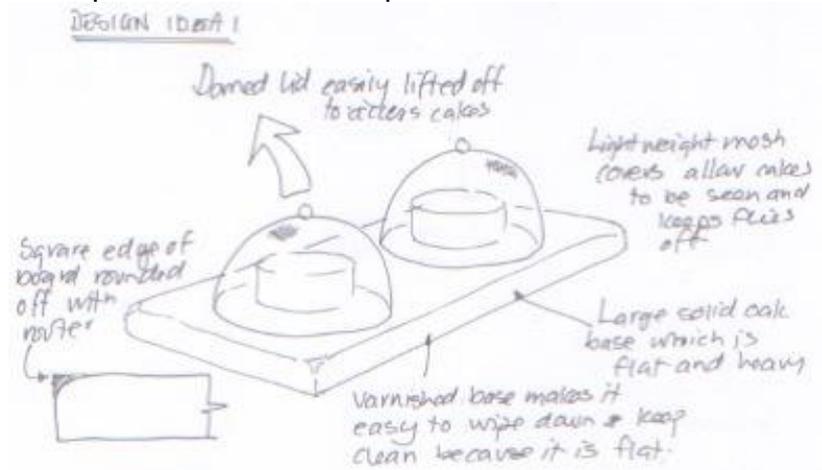
Question Number	Answer	Mark
11. (c) (ii)	<p>Two finishes given from:</p> <ul style="list-style-type: none"> • Paint (1) • Varnish (1) • Stain (1) • Bees wax /wax (1) • Shellac (1) • Lacquer (1) • Danish oil / linseed oil / oil (1) • Sanding sealer (1) <p>(Do not accept two different types / colours or types of paint / varnish – satin and gloss)</p> <p style="text-align: right;">2 x 1</p>	(2)

Question Number	Answer	Mark
11. (c) (iii)	<p>Two advantages described from:</p> <ul style="list-style-type: none"> • The file/program is created once (1) and can be used over and over again / easily repeated / no marking out required (1) • Once tested and set up (1) there is no need for human intervention / human error / reduced labour costs (1) • The machine can run 24/7 (1) which means greater output / efficiency (1) • It is very accurate/every component will be the same size (1) which means rejects will be fewer / fewer mistakes / less material wasted / parts will fit / identical parts (1) • Great detail can be achieved (1) which means complex shapes can be achieved (1) • Little edge finishing is required (1) which means production time / secondary processing is reduced (1) • Text/pictures (1) can be engraved onto the surface by adjusting laser power (1) • Clean edges produced (1) leaves no sharp / jagged edges (1) • Quick / fast process (1) so many items can be cut in a short amount of time (1) • Identical components cut (1) because it is computer numerically controlled CNC machine (1) • Adaptable process / power easily adjusted (1) so it can cut different materials (1) <p><i>Do not accept CAD related answers</i></p> <p style="text-align: right;">2 x 1 2 x 1</p>	<p style="text-align: center;">(4)</p>

Question Number	Answer	Mark
11. (d)	<p>Two advantages described from:</p> <ul style="list-style-type: none"> • Acrylic will not burn (1) and discolour like wood (1) • No edge finishing is required (1) which will speed up production time / reduce costs (1) • Acrylic is available in many colours / shiney (1) and therefore does not need a surface finish applying / more colourful / appealing / aesthetic (1) • Easier to clean (1) therefore more hygienic (1) • Acrylic has no grain (1) so no splinters to cause injury (1) • Acrylic is lighter (1) therefore easier to move / carry / for toddlers to play with (1) • Water resistant (1) therefore will repel water / not absorb water / saliva if a child puts the piece in their mouth / more durable (1) • Less likely to be damaged by being put in the mouth (1) because it is more durable than wood (1) <p style="text-align: right;">2 x 1 2 x 1</p>	(4)

Question Number	Answer	Mark
12.	<p>Design idea 1</p> <p>Candidates may answer any specification point in either graphical form or by annotation.</p> <p>No marks are awarded for the quality of graphical communication.</p> <ul style="list-style-type: none"> • hold two cakes (1) <p>e.g. side by side / on top of each other on shelves / pillars</p> <ul style="list-style-type: none"> • allow the cakes to be seen by the customers (1) <p>e.g. in a cupboard unit / under clear domes / wire mesh / jars</p> <p>If acrylic or glass has been shown but not stated it is see through or transparent and you CANNOT see the cakes inside, no marks can be awarded.</p> <ul style="list-style-type: none"> • allow the cakes to be accessed by the coffee shop staff (1) <p>e.g. drawers / domes with handles / covers</p> <ul style="list-style-type: none"> • protect the cakes from flies (1) <p>e.g. under a dome or cover/ doors</p> <ul style="list-style-type: none"> • have a stable base (1) <p>e.g. large surface area / heavy base / tripod / contact area</p> <ul style="list-style-type: none"> • allow any crumbs to be easily removed (1) <p>e.g. surface finish / trays / flat area / paper base / plates</p> <ul style="list-style-type: none"> • be made from materials available in a school workshop (1) <p>e.g. specific named material oak, acrylic</p> <ul style="list-style-type: none"> • be manufactured using processes available in a school workshop and process suitable to material (1) <p>e.g. specific named process – dome blowing can be done in some vacuum forming machines</p>	

Example of candidate response:

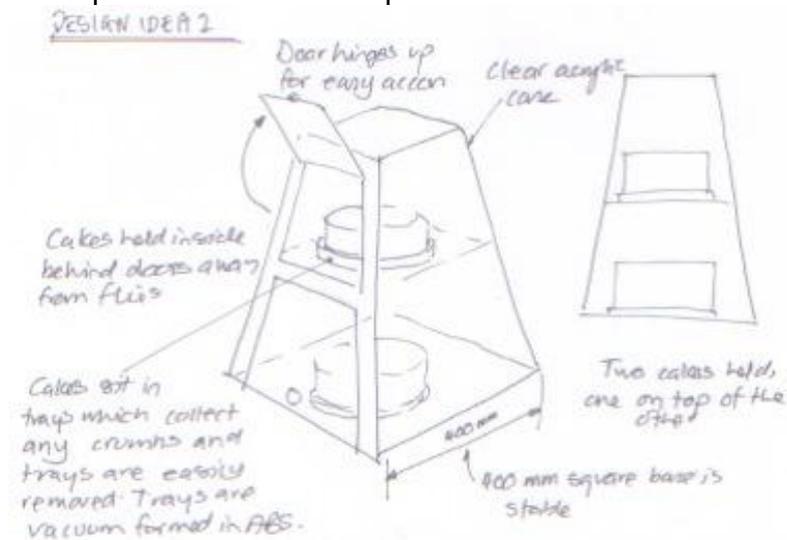


8 x 1

Design idea 2

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

Example of candidate response:



8 x 1

(8)

(8)

Question Number	Answer	Mark
13. (a)	<p>Two properties given and linked justification from:</p> <p>Property: Tough (1) Justification: It can withstand knocks / being dropped / hit with hammer (1)</p> <p>Property: Electrical insulator (1) Justification: It will protect from electric shocks (1)</p> <p>Property: Plasticity (1) Justification: It can be injection moulded / easily moulded (1)</p> <p>Property: Lightweight (1) Justification: So it can be used for long periods without causing injury / RSI (1)</p> <p>Property: Resistant to chemicals (1) Justification: Will not be effected by any liquids / fluids / paints / white spirit (1)</p> <p style="text-align: right;">2 x 1 2 x 1</p>	(4)

Question Number	Answer	Mark
13. (b)	<p>A definition to include:</p> <ul style="list-style-type: none"> • The ability of a material to withstand abrasive wear/scratching (1) and indentation (1) <p style="text-align: right;">2 x 1</p>	(2)

Question Number	Answer	Mark
13. (c) (i)	<p>One reason explained from:</p> <ul style="list-style-type: none"> • The handle is an insulator (1) and will therefore not conduct electricity (1) • The handle / grip has been shaped / formed / styled / has texture / ergonomically designed (1) so it will not slip / twist in hand (1) • Rounded handle (1) so fits into palm of hand (1) <p>(Do not accept anything related to being cut by the blade / sharp edge on blade)</p>	

	Do not accept repeat of the stem 'easy to use'	(2)
		2 x 1

Question Number	Answer	Mark								
13. (d) QWC	<p>Evaluation to address the following issues: Materials and components What materials and components are needed and how should they perform?</p> <table border="1"> <thead> <tr> <th>Screwdriver</th> <th>Cordless drill</th> </tr> </thead> <tbody> <tr> <td> <ul style="list-style-type: none"> • Only two separate components are required • The steel blade needs to be hard and heat treated • The plastic handle should be an electrical insulator • The blade can be moulded directly into the plastic handle • The handle should provide a good grip • Easier to recycle / fewer bits / parts </td> <td> <ul style="list-style-type: none"> • There are lots of separate components which make this an expensive product / more things to go wrong • The battery should be easy to recharge and have a long life • The materials should be tough and capable of withstanding knocks and bumps • The gears should allow different speeds to be achieved • The switch lever underneath allows the direction to be changed </td> </tr> </tbody> </table> <p>OK to accept comments about cost and environment under this heading if the comparison is based on respective number of component parts / cost of assembly</p> <p>Function What is the product for?</p> <table border="1"> <thead> <tr> <th>Screwdriver</th> <th>Cordless drill</th> </tr> </thead> <tbody> <tr> <td> <ul style="list-style-type: none"> • Limited function, can only be used for putting in / taking out flat head screws • Sometimes abused to open tins of paint • Requires more manual effort to turn and rotate than the cordless </td> <td> <ul style="list-style-type: none"> • Can be used to drill holes with the appropriate drill bit • Can be used with a countersink bit to recess sections for screws to go in • Can be used with different bits to put in / take out different types of screws </td> </tr> </tbody> </table>	Screwdriver	Cordless drill	<ul style="list-style-type: none"> • Only two separate components are required • The steel blade needs to be hard and heat treated • The plastic handle should be an electrical insulator • The blade can be moulded directly into the plastic handle • The handle should provide a good grip • Easier to recycle / fewer bits / parts 	<ul style="list-style-type: none"> • There are lots of separate components which make this an expensive product / more things to go wrong • The battery should be easy to recharge and have a long life • The materials should be tough and capable of withstanding knocks and bumps • The gears should allow different speeds to be achieved • The switch lever underneath allows the direction to be changed 	Screwdriver	Cordless drill	<ul style="list-style-type: none"> • Limited function, can only be used for putting in / taking out flat head screws • Sometimes abused to open tins of paint • Requires more manual effort to turn and rotate than the cordless 	<ul style="list-style-type: none"> • Can be used to drill holes with the appropriate drill bit • Can be used with a countersink bit to recess sections for screws to go in • Can be used with different bits to put in / take out different types of screws 	(6)
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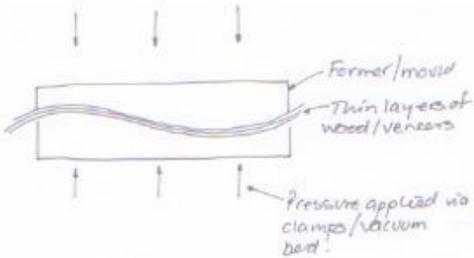
		<ul style="list-style-type: none"> • Can tighten / undo better than by hand • Can be used at different speeds / torque settings 	
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Level	Mark	Descriptor
	0	No rewardable material
Level 1	1-2	Candidate identifies the area(s) of comparison with no development OR identifies and develops one area. Shows limited understanding of the comparison. Writing communicates ideas using everyday language but the response lacks clarity and organisation. The candidate spells, punctuates and uses the rules of grammar with limited accuracy.
Level 2	3-4	Candidate identifies some areas of comparison with associated developments showing some understanding of the comparison. Writing communicates ideas using D&T terms accurately and showing some direction and control in the organising of material. The candidate uses some of the rules of grammar appropriately and spells and punctuates with some accuracy, although some spelling errors may still be found.
Level 3	5-6	Candidate identifies a range of areas of comparison with associated developments showing a detailed understanding of the comparison. Writing communicates ideas effectively, using a range of appropriately selected D&T terms and organising information clearly and coherently. The candidate spells, punctuates and uses the rules of grammar with considerable accuracy.

Question Number	Answer	Mark
14. (a) (i)	<p>Two advantages given from:</p> <ul style="list-style-type: none"> • Saves time / speeds up marking out time (1) • All components will be the same / identical / accurate (1) • Can lay plan / tessellate shapes / reduces waste (1) • Reduces materials consumption / saves resources (1) • Large quantities marked out quickly (1) • Template can be stored away and reused when necessary (1) • Correct size and shape achieved each time (1) <p style="text-align: right;">2 x 1</p>	(2)

Question Number	Answer	Mark
14. (a) (ii)	<p>Two thermoplastics named:</p> <ul style="list-style-type: none"> • Acrylic (1) • Polyethene HDPE / LDPE (1) • PVC (1) • High impact polystyrene HIPS (1) • ABS (1) • Polypropylene (1) • Nylon (1) • Polystyrene / LD / HD (1) <p style="text-align: right;">2 x 1</p>	(2)

Question Number	Answer	Mark
14. (a) (iii)	<p>Two advantages explained from:</p> <ul style="list-style-type: none"> • They can be re-heated / re-moulded (1) which means any mistakes / errors can be reprocessed / corrected (1) • Thermoplastic are generally soft / flexible (1) which means they will 'give/flex' when pressure is applied so they will not snap (1) • They can be recycled (1) and therefore reduce the demand on finite resources / used again / reduce environmental impact (1) <p style="text-align: right;">2 x 1 2 x 1</p>	(4)

Question Number	Answer	Mark
14. (b)	<p>Notes and sketches used to show / cover the following points:</p> <ul style="list-style-type: none"> • Thin layers of wood / slats / veneer /soaked wood (1) • Glue is applied / PVA / 'Cascamite' (1) • Held under pressure in former with clamps / vacuum pump / glue sets (1) <div style="text-align: center;">  </div> <p>(Preparation of materials and process covered) 3 x 1 Can award 2 marks if layers and glue are mentioned without a former to make a flat sheet</p>	(3)

Question Number	Answer	Mark
14. (c)	<p>One advantage described from:</p> <ul style="list-style-type: none"> • Wood is sustainable / renewable / managed FSC (1) so puts less demand on non-renewable resources such as oil / new trees re-planted to replace those cut down (1) • Wood will decompose over time / organic material (1) which means it has a complete LCA / can be composted (1) • Wood can be burnt (1) which can be used to generate heat (1) • Less drilling for oil is required (1) which reduces the risk of any environmental accidents as a result of spillage / leaks (1) • Trees grow naturally / do not use energy (1) unlike producing plastic which is energy dependent (1) <p>(Do not accept anything related to financial cost / cheaper)</p> <p style="text-align: right;">2 x 1</p>	(2)

Question Number	Answer	Mark
<p>14. (d) QWC (iii)</p>	<p>REMEMBER indicative content</p> <p>Discussion to address the following issues:</p> <ul style="list-style-type: none"> • Emails are easily sent to large address books / databases of customers / target customers • Retailers build up a profile of your shopping habits such as likes / dislikes and send out emails with recommendations of things you might like • Your personal details can be obtained by hackers / 'phishers' / email scams • Email lists are sold off to other companies resulting in lots of spam / additional email traffic • You can search the internet from your own home without having to go out / save fuel / travel costs / loss of social interaction • You can compare prices easily compared to wandering around high street shops • You can often find reviews about products on line / read / post reviews • Most people now have mobile devices which means they can access sites on the move • Companies can follow you and offer special offers for those in the vicinity of their high street stores 'first 50 people to show up at Starbucks with this e-coupon' • Large databases can be recorded of product data • Payments can be made on line using 'PayPal' etc • Retailers have less costs as they do not need shop premises • Lots on offer / too much for some people / overwhelming / puts people off • Some people may not have internet access and are disadvantaged • Use of social media • Only see pictures / images of product and not able to pick it up / feel it / try it on • Items can go missing in the post / postage costs 	<p>(6)</p>

Level	Mark	Descriptor
	0	No rewardable material
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