

Mark Scheme (Results)

Summer 2010

GCSE

GCSE Design and Technology:
Resistant Material Technology (1973)
Paper 2F
Foundation Written Paper.

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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.

Introduction:

Give / State / Name

Normally a one or two word answer, at the very most a short sentence.

Describe

Normally, one or two sentences which form a description, making reference to more than one point. All points must be linked for a complete answer.

Explain

Normally, one or two sentences which form an explanation. This requires a clear or detailed account of something and includes a relevant justification, reason or example.

Evaluate

Normally one or two sentences where the quality, suitability or value of something is judged. This can include both positive and negative points, with each point normally, requiring a relevant justification.

The mark scheme contains a range of possible answers for all questions. For some questions it is possible to provide a finite number of acceptable answers. However, in some instances it is not possible to provide every conceivable answer. In these instances objective guidance is provided.

For all answers candidates are not expected to give the exact wording contained in this mark scheme. However, to gain credit their answer must demonstrate the same meaning as detailed in the mark scheme.

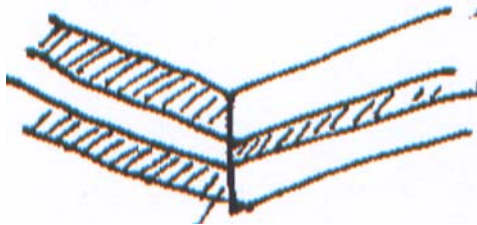
It is the examiner's responsibility to apply their professional judgement in determining if what the candidate has written has the same meaning as the answer detailed in the mark scheme. For all answers the '*Key words*' have been written in bold text.

For describe and explain questions, candidates may give a different combination of the marking points listed in the mark scheme. In such instances candidates can be rewarded for the marking points provided that they are suitably linked. However, candidates cannot be rewarded for the same point repeated in two different combinations.

Question Number	Answer	Mark
1(a)	<p>Name and use that can be carried out by using the following:</p> <p>Name: Coping saw (1) Use: Cutting / sawing shapes / curves in wood/plastic (1)</p> <p>Name: Brazing / gas torch (1) Use: Heating / melting / metals / brazing / soldering / welding / heat treatment processes (1)</p> <p>Name: Screwdriver (1) Use: Putting in / taking out / turning screws (1) <i>(do not accept screwing on it's own)</i></p> <p>Name: Computer / PC / desktop / monitor / keyboard / processor / CPU / workstation / VDU /display / TFT / screen (1) <i>(Do not accept 'laptop')</i> Use: Office tasks / internet / CAD/CAM / working / inputting downloading / research / writing / word processing / research communicating / e-mailing / DTP / entertainment / playing/burning CDs /messaging / homework / viewing / editing / marking / browsing / surfing the net/web (1)</p> <p>Name: Till / cash register / EPOS till (1) <i>(Do not accept cash machine / checkout)</i> Use: Registering sales / stock levels / store money / give receipts / calculate change (1)</p> <p style="text-align: right;">(10x1)</p>	(10)

Question Number	Answer	Mark
1(b)	<p>Two safety precautions given from:</p> <ul style="list-style-type: none"> • Wear goggles (1) • Tie back hair (1) • No jewellery / bracelets (1) • Make sure work is held tight / secure (1) • Only one user at a time (1) • Correct speed for size of drill (1) • Drill is in tight (1) • Chuck key is removed (1) • Wear an apron (1) • Make sure the (chuck guard) is down (1) <p style="text-align: right;">(2x1)</p>	(2)

Question Number	Answer	Mark
1(c)	<ul style="list-style-type: none"> • Hole saw (1) • Flat bit (1) • Countersunk bit (1) <p style="text-align: right;">(1x1) (1x1) (1x1)</p>	(3)
Question Number	Answer	Mark
1(d)	<ol style="list-style-type: none"> 1. Production line (1) 2. Computer Integrated Manufacture (CIM) (1) 3. Quality control (1) <p>(only answers)</p> <p style="text-align: right;">(1x1) (1x1) (1x1)</p>	(3)
Question Number	Answer	Mark
1(e)(i)	<p>Two reasons given from:</p> <ul style="list-style-type: none"> • Allows 3D models to be made / viewed (1) • Easy to amend / change (1) • Easy storage / retrieval of data (1) • Designs can be sent via e-mail / attachments (1) • Easy to convert to CAM (1) • Simulations / test can be carried out before hand (1) <p style="text-align: right;">(2x1)</p>	(2)
Question Number	Answer	Mark
1(e)(ii)	<p>One reason described from:</p> <ul style="list-style-type: none"> • Production will be 24/7 (1) therefore production will be non-stop (1) • Fewer workers required (1) which means less labour costs (1) • Once programmed / set up (1) it can be recalled / uploaded at any time (1) • Changes / amendments (1) can be quickly implemented (1) • Very accurate / identical (1) therefore cutting down on waste / rejects (1) <p style="text-align: right;">(2x1)</p>	(2)
Total for question 1		22 marks

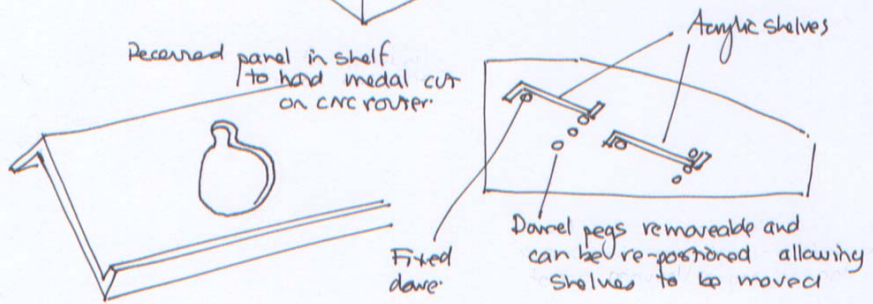
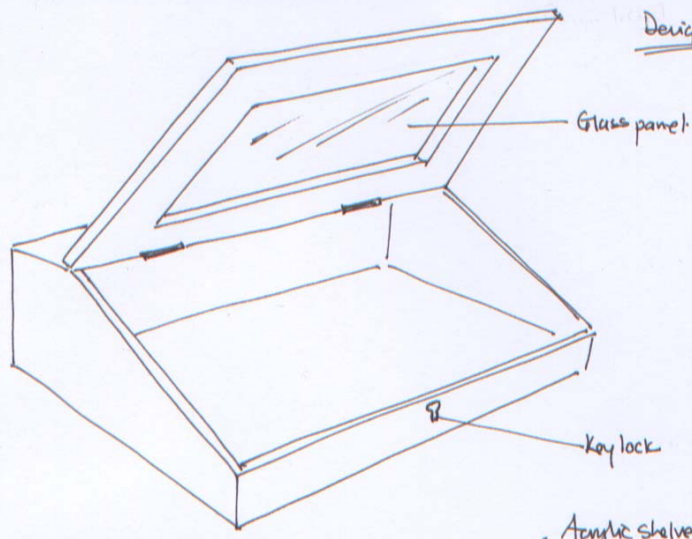
Question Number	Answer	Mark
2(a)(i)	<ul style="list-style-type: none"> Mild steel (1) <p>(only answer)</p> <p style="text-align: right;">(1x1)</p>	(1)
Question Number	Answer	Mark
2(a)(ii)	<ul style="list-style-type: none"> ABS (1) <p>(only answer)</p> <p style="text-align: right;">(1x1)</p>	(1)
Question Number	Answer	Mark
2(b)	<p>Two reasons given from:</p> <ul style="list-style-type: none"> Stop it rusting (1) Improve aesthetics / appearance (1) Cover sharp edges (1) Cost effective (1) Uniform finish / coating (1) Durable finish (1) Insulator / prevents electrical shock (1) Easy to maintain / clean (1) Easily applied when heated (1) Easier to grip (1) <p style="text-align: right;">(1x1) (1x1)</p>	(2)
Question Number	Answer	Mark
2(c)(i)	<p>Answer must show by either notes or sketches:</p>  <ul style="list-style-type: none"> Indication of an odd number of layers (1) Indication of direction of outside layers/grain/core/heart (1) <p style="text-align: right;">(1x1) (1x1)</p>	(2)

Question Number	Answer	Mark
2(c)(ii)	<p>Three properties given from:</p> <ul style="list-style-type: none"> • Good strength to weight ratio (1) • Resistant to splitting (1) • Resistant to warping (1) • Durable (1) • Good dimensional stability (1) • Stiff / rigid (1) <p style="text-align: right;">(1x1) (1x1) (1x1)</p>	(3)
Question Number	Answer	Mark
2(c)(iii)	<p>One reason described from:</p> <ul style="list-style-type: none"> • The surface can be finished better (1) making it more attractive / durable (1) • Tougher (1) as it will not splinter / flake away if damaged (1) • Stronger (1) meaning it can support more weight (1) • More dense (1) therefore will take more punishment (1) <p style="text-align: right;">(2 x 1)</p>	(2)
Question Number	Answer	Mark
2(d)	<p>Three benefits given from:</p> <ul style="list-style-type: none"> • Greater / improved product reliability / quality (1) • Safe to use / product has met minimum safety standard (1) • Less likely to break (1) • Has a guarantee / gives consumer confidence in product / enhanced product value (1) <p><i>(Response must be focused to benefits for the consumer)</i></p> <p style="text-align: right;">(1x1) (1x1) (1x1)</p>	(3)
Question Number	Answers	Mark
2(e)	<p>Two ways given from:</p> <ul style="list-style-type: none"> • The whole process is cheaper / will save money / cheaper products(1) • New products will come to the market faster (1) • More reliable products / greater quality control (1) • Greater product availability (1) <p><i>(Response must be focused to benefits for the consumer)</i></p> <p style="text-align: right;">(1x1) (1x1)</p>	(2)

Question Number	Answer	Mark
2(f)	<p>Two reasons given from:</p> <ul style="list-style-type: none"> • Keep turnover /sales going (1) • New materials / technology (1) • New market / audience (1) • Improved design and function (1) • Improved aesthetics / style (1) <p>(1x1) (1x1)</p>	(2)
Question Number	Answer	Mark
2(g)(i)	<p>Two disadvantages given from:</p> <ul style="list-style-type: none"> • Replacements use valuable resources /deforestation /mining (1) • Could pollute / contaminate the ground / harm environment (1) • Components take a long time to degrade (1) • Increases landfill / waste production (1) • Take 100's of years to breakdown / decompose (1) <p>(1x1) (1x1)</p>	(2)
Question Number	Answer	Mark
2(g)(ii)	<p>One way described from:</p> <ul style="list-style-type: none"> • Steel: can be melted down (1) and reformed / recast / new components (1) • Plywood top: can be chipped (1) and used as compost / mulch / chipboard (1) • Plastic handles: can be melted / chipped (1) and reprocessed / new components (1) <p>(1x1) (1x1)</p>	(2)
Total for question 2		22 marks

Question Number	Answer	Mark
3(a)	<p>Design Idea 1 Each point of the specification has two marking points.</p> <p>1 mark should be awarded for evidence of each point of the specification resolved in the design.</p> <p>When an answer does not viably answer a specification point 0 marks</p> <p>For each specification point with only one element viably satisfied 1 mark</p> <p>For each specification point with both elements viably satisfied 2 marks</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 communication</p> <p>Each specification resolved in design</p> <p>The medal cabinet must be lockable and allow the medals to be seen.</p> <ul style="list-style-type: none"> • Evidence given / shown that the cabinet is lockable Eg. Lock / bolt / padlock / combination lock / key lock • Evidence given / shown that the medals can be seen Eg. Glass door / acrylic panel / sliding doors <p>The medal cabinet must have shelves that can be easily adjusted to different heights.</p> <ul style="list-style-type: none"> • Evidence given / shown there are shelves Eg. form /shape /layout • Evidence given / shown that the shelves are adjustable to different heights Eg. Brackets / lugs / shelf supports / dowel pegs <p>The medal cabinet must hold the medals in a fixed position.</p> <ul style="list-style-type: none"> • Evidence given / shown that the medals are held Eg. Dowel pegs / slots /cut out / recessed shapes • Evidence given / shown that the medals are in a fixed position Eg. Will not move / trapped <p>The medal cabinet must be made using materials and processes suitable for one-off production.</p> <ul style="list-style-type: none"> • Specific material named • Process given Eg. tools / process / machinery 	(8)

Design Idea!



Design Idea 2

To score a mark for Design Idea 2, each specification point must be resolved in 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 locking (1)

A different method of being able to see medals (1)

A different form of shelves (1)

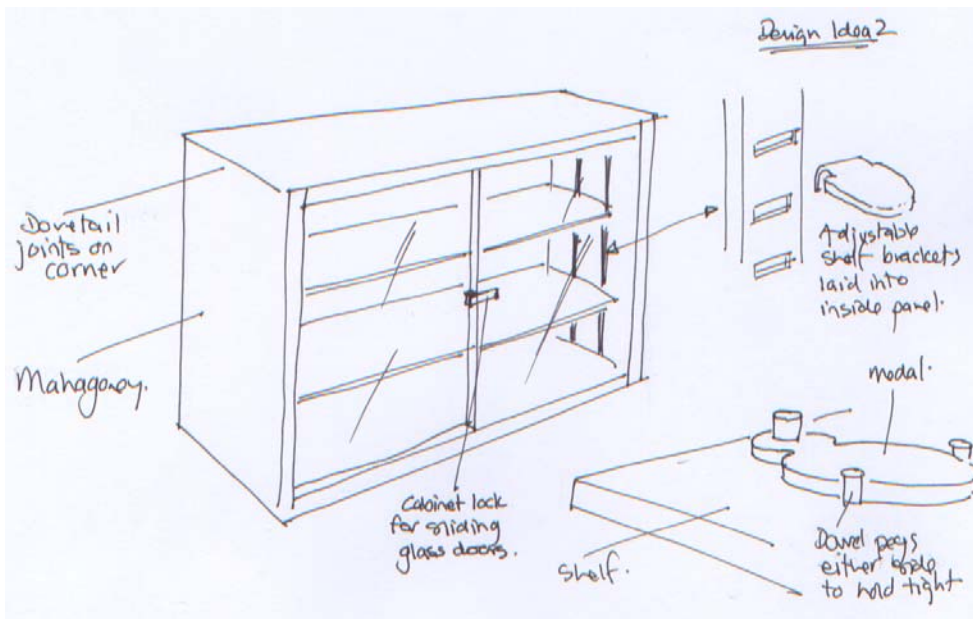
A different method of holding at different heights (1)

A different method holding medals (1)

A different method of being in a fixed position (1)

A different specific material named (1)

A different suitable process (1)



(8)

Question Number	Question	Mark
3(b)	<p><i>Answer</i> <i>Each point clearly evaluated.</i></p> <p><i>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.</i></p> <p><i>The evaluation of the design must contain reference to either positive or negative aspects not simply just a description of the design.</i></p> <p><i>Award 1 mark for a correct evaluation / justification relating to each design feature and how it succeeds or fails.</i></p> <p><i>Repetition of original spec scores 0.</i></p>	
3(b)(i)	<p>The medal cabinet must be lockable and allows the medals to be seen.</p> <ul style="list-style-type: none"> • Provision of lock (1) • Ability to see medals (1) <p style="text-align: right;">(1x1) (1x1)</p>	(2)
3(b)(ii)	<p>The medal cabinet must have shelves that can be easily adjusted to different heights.</p> <ul style="list-style-type: none"> • Form /shape / layout (1) • To different heights (1) <p style="text-align: right;">(1x1) (1x1)</p>	(2)
3(b)(iii)	<p>The medal cabinet must hold the medals in a fixed position.</p> <ul style="list-style-type: none"> • Holding medals (1) • How they are fixed in position (1) <p style="text-align: right;">(1x1) (1x1)</p>	(2)
Total for question 3		22 marks

Question Number	Answer	Mark
4(a)(i)	<p>Three each of the following: Specification points Reasons (Do not accept repetition of the specification points)</p> <p><u>Quality</u> Point: strong construction Reason: carry heavy weight</p> <p>Point: smooth edges Reason: so no injury is caused to the user</p> <p>Point: accurate fitting of the hand grip Reason: so it does not fall off and get lost / cause injury to user on sharp end</p> <p>Point: the wheel / tyre should be well fitted Reason: so that it does not come off and cause injury / allow for wheel to rotate</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 style="text-align: right;">(2x1)</p>	(2)
4(a)(ii)	<p><u>Environment</u> 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</p> <p style="text-align: right;">(2x1)</p>	(2)
4(a)(iii)	<p><u>Safety</u> Point: stable base Reason: so it does not fall over</p> <p>Point: hand grips Reason: so it is soft / smooth for the user to hold the end of the handle</p> <p>Point: strong materials Reason: so that they do not break / fail / collapse when moving heavy loads</p> <p>Point: finished well / no sharp edges Reason: does not cause injury to users</p> <p style="text-align: right;">(2x1)</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></p>	(2)

Question Number	Answer	Mark
4(b)	<p>Two reasons given from:</p> <ul style="list-style-type: none"> • Readily available in range of sizes / shapes (1) • Easily machined / cut / bent / formed (1) • Can be finished in different ways / colours (1) • Relatively cheap (1) • Good compressive strength (1) • Can be recycled once it reaches the end of its useful life (1) • Lightweight in comparison to solid section (1) • Good strength to weight ratio (1) • Tough (1) • hard (1) • malleable (1) • ductile (1) <p><i>(Do not accept can be easily joined by welding / brazing or strong)</i></p> <p style="text-align: right;">(1x1) (1x1)</p>	(2)
Question Number	Answer	Mark
4(c)	<p>Two reasons given from</p> <ul style="list-style-type: none"> • Good surface finish / self finishing / no additional surface finishing required (1) • Suitable for mass / high volume production (1) • Repeatability / identical (1) • Many can be made in one mould (1) • High tolerance / very accurate (1) • Colours can be changed (1) • Unit costs are low once mould has been paid for (1) • Can produce a complex form (1) <p><i>(Do not accept easy / quick / cheap / unless qualified)</i></p> <p style="text-align: right;">(1x1) (1x1)</p>	(2)

Question Number	Answer	Mark
4(d)	<p>Two properties and reasons given from:</p> <p>Property: Lightweight Reason: does not make it too heavy to lift</p> <p>Property: Toughness / high impact strength Reason: will stand up to knocks and bumps / will withstand things being dropped into it</p> <p>Property: Plasticity / easily moulded Reason: so it can be easily injection moulded / blow moulded / plug and yoke moulded / formed</p> <p>Property: Durable / weatherproof / waterproof Reason: will withstand weathering / does not absorb water / will stand up against outside elements / last longer</p> <p>Property: Resistant to chemicals / corrosion Reason: Any cement / building materials / compost / fertilizers will not cause any damage to the surface</p> <p><i>(Do not accept strong/anything relating to electrical insulating properties)</i></p> <p style="text-align: right;">(2x1) (2x1)</p>	(4)
Question Number	Answer	Mark
4(e)	<p>One reason explained from:</p> <ul style="list-style-type: none"> • To make sure that items are correct size / dimensionally accurate / within tolerances (1) so that they will all fit together (1) • To check that the item has been correctly assembled (1) so that it does not fall apart / collapse which might cause an injury to the user (1) • To ensure colour match (1) so that it meets corporate image/branding/spec (1) <p><i>(Do not accept anything related to quality in a generic sense)</i></p> <p style="text-align: right;">(2x1)</p>	(2)

Question Number		Mark
4(f)	<p>One explanation from:</p> <ul style="list-style-type: none"> Improves aesthetic appeal (1) which will attract users / purchaser (1) Protective layer (1) which means that it will not rust / corrode / last longer (1) <p>(2x1)</p>	(2)
Question Number	Answer	Mark
4(g)(i)	<p>Carry heavy loads</p> <p>One explanation from:</p> <ul style="list-style-type: none"> The two large handles increases the mechanical advantage / leverage (1) which is makes it easier (1) the shape of the tray (1) means that a larger volume / load can be carried (1) the tough / durable tray (1) is supported by a frame / structure (1) <p>(2x1)</p>	(2)
4(g)(ii)	<p>Go over rough, wet ground</p> <p>One explanation from:</p> <ul style="list-style-type: none"> It has a big tyre / wheel / pneumatic inner tube / inflatable tyre (1) which means it take / absorb the shock of bumps and bricks / stones / spreads the load (1) The large surface area of the tyre (1) means it is less likely to sink / stick in wet mud / wet conditions (1) It only has one wheel (1) which prevents grounding / bottoming out (1) <p>(2x1)</p>	(2)
Total for question 4		22 marks
TOTAL FOR PAPER: 88 MARKS		

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