

Design & Technology (Resistant Materials)

General Certificate of Secondary Education **GCSE 1956**

General Certificate of Secondary Education (Short Course) **GCSE 1056**

Mark Schemes for the Components

June 2007

1956/1056/MS/R/07

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All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

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General Certificate of Secondary Education (Short Course) Resistant Materials (1056)

MARK SCHEMES FOR THE UNITS

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Mark Scheme 1056/01, 1956/01
June 2007

- 1 (a) Tool used to make sides flat: accept plane or specific smoothing or jack plane. [1]
NOT sander/sanding/saws
- (b) (i) Cramps are sash or bar. [1]
- (ii) Reason to prevent damage/bruising or to distribute pressure. [1]
- (iii) Waterproof glue due to likelihood that board will be immersed in water. [1]
Liquids in vegetables OK
Washing/cleaning OK
- (c) Board made smooth by means of plane, glasspaper, scraper. [1]
Sander/Sanding/Sandpaper OK
- (d) No surface finish due to risk of 'tasting' the food prepared, finish may chip. [1]
Health/hygiene risks OK
- (e) (i) Handhold design: holes grooves or rebate for fingers. (0-2) [2]
Sketch/note for 2 marks
If vague use Part ii to inform
- (ii) Two named tools used to produce the handhold. (2 x 1) [2]
Saw OK
Do NOT accept marking out tools
- 2 (a) Reason for aluminium: easy to bend, easily kept clean, corrosion resistant. [1]
Malleable OK
- (b) Stage 1 shape ends using a file/sanding disc/saw/sander Router/miller OK (1)
- Stage 2 produce holes using drill, drilling machine, brace, bit. (1)
- Stage 3 bend metal using a hammer, mallet, former/anvil/jig Vice OK NOT Clamp (1)
- Stage 4 clean metal using wire/steel wool, emery cloth, wet and dry, buffer, meths and cloth. (1) [4]
Polish/metal polish
- (c) Jig must fit into a vice. V(1)
Stated or clear from Sketch
- Hold rod securely. S(0-2)
If only hand held (1 mark)
If handheld & additional support (2 marks)
- Lengths cut accurately. A(0-2)
End stop (1)
Saw Guide (1) [5]

- 3 (a) Stage 1 marking out the shape. (1)
- Stage 2 cleaning/smoothing the edges of the acrylic. (1)
- Stage 3 polishing the edges of the acrylic on a polishing mop. (1) [3]
Any reference to improving appearance OK
- (b) Method of heating: oven, strip heater, line bender H(1)
- former/mould used to achieve shape F(0-2)
Accept line bender with integral former
If for wrong bend (1 mark)
- method of retention while plastic cools. R(0-2) [5]
If handheld only (1mark)
Handheld against former (2 marks)
- (c) Two reasons for expense: more processes, more components [1]
- greater range of materials, increased labour, longer to make [1]
- 4 (a) Template used to mark out the ends, positions for handle, front and back rods. [1]
- Jig used to drill holes for rods, to saw rods/covers, handle to length.
- Allow 2 jigs **or** 2 templates. [1]
- (b) Covers must pivot upwards using either a wooden/metal pin or woodscrew [2]
Well communicated practical idea. (0-2)
Accept hinges if connecting rail is evident
- (c) Methods of producing the letters are either by engraving or application. [1]
- Three stages include details relating to setting up and machining of engraved letters. [1]
- Or details included relating to setting up and machining vinyl etc [1]
- Accept reference to CAD as **one** stage only.
- (d) Reason for polyurethane varnish is to protect from weather. [1]
- (e) Tests and trials could be carried out by giving prototype to potential users. (1)
- Feedback obtained by means of questionnaire/survey/interview. (1) [2]

- 5 (a) Property of beech includes: tough, close grained, does not split easily, takes a good finish. [1]
Hard wearing OK
- (b) Safety considerations include: no small/loose components, no sharp edges, no nip points, enclosed firing area [1]
- (c) Some form of strip or block to support the machine.
The strip, block etc needs to be fixed so that it can move by means of screws, nut and bolt, hinge S(0-2)
Details of materials and fittings used. D(1) [3]
- (d) Base fitted to sides by means of groove, rebate or applied bead.
Dowel/glue or Screwed = 1 mark if underneath
Dowel/glue or Screwed = 0 mark if from side [2]
Accuracy of technical detail. (0-2)
Pin and glue = 1 mark only.
Glued only = 0 marks
Biscuit = 0 marks
- (e) Firing mechanism will be a spring. S(1)
Correct position of firing pin in relation to sides of machine. P(1) [3]
Firing Pin Position
Correct position of firing pin in relation to spring. R(1)
Retention of Pin & Spring in use

Mark Scheme 1056/02, 1956/02
June 2007

- 1 (a) Template used to mark out the ends, positions for handle, front and back rods. [1]
Jig used to drill holes for rods, to saw rods/covers, handle to length.
Allow 2 jigs or 2 templates. [1]
- (b) Covers must pivot upwards using either a wooden/metal pin or woodscrew [2]
Well communicated practical idea.
Accept hinges if connecting rail is evident
- (c) Methods of producing the letters are either by engraving or application. [1]
Three stages include details relating to setting up and machining of engraved letters. [1]
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- (d) Reason for polyurethane varnish is to protect from weather. [1]
- (e) Tests and trials could be carried out by giving prototype to potential users. (1)
Feedback obtained by means of questionnaire/survey/interview. (1) [2]
- 2 (a) Property of beech includes: tough, close grained, does not split easily, [1]
Hard wearing OK
- (b) Safety considerations include: no small/loose components, no sharp edges, [1]
no nip points, enclosed firing area
- (c) Some form of strip or block to support the machine.
The strip, block etc needs to be fixed so that it can move by means of screws,
nut and bolt, hinge S(0-2)
Details of materials and fittings used. D(1) [3]
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Accuracy of technical detail. (0-2)
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- (e) Firing mechanism will be a spring. S(1)
Correct position of firing pin in relation to sides of machine. P(1) [3]
Firing Pin Position
Correct position of firing pin in relation to spring. R(1)
Retention of Pin & spring in use

- 3 (a) Aluminium suitable due to lightweight and resistance to corrosion, self finishing
(1)
Accept 'light'
- Or
- Steel suitable due to relatively cheap cost, durable metal, hard wearing (1) [1]
- (b) Two items of information include: location, number of shoes to store, sizes of shoes, costs of manufacture, tooling, potential product run. [1]
- Only one answer referring to shoe size is acceptable [1]
- (c) Use of a screw or bolt through end strip with a modification inside end of tubular rail to provide thread for screw or bolt.
- Some form of overlapping joint using slots.
- The use of a 'lug' attached to the end strip with the tube connected and secured by means of a pin.
- Method of fastening, accuracy (0-3) [3]
- (d) Practical design using different diameter tube to slide inside each other. P(0-2)
If extending with a replica principle = 0
- Accuracy of details of materials and fittings including locking/extension stops
D(0-1) [4]
- Rigidity R (1)

- 4 (a) Two advantages of vacuum formed tray: each tube of paint has its own fitted storage space, can take up less space/fit more tubes, quicker/easier to produce once mould has been produced, cheaper therefore to manufacture in quantity, easier to clean. [1]
[1]
- Quicker/easier/cheaper – must be qualified
- (b) Ergonomics: visual layout of tubes in plastic tray, access enabling user to pick up tubes easily, general point relating to easing of edges/corners etc [1]
- (c) Recognised 'catch' includes: magnetic catch, toggle catch or hasp and staple, velcro R(0-2)
- Correct positioning in relation to lid and sides. P(1) [3]
- (d) Brushes stored securely in grooves or holes with some form of retention and bristles not likely to be damaged. Method of storage allows for ease of access. S(0-2)
- Sizes allowed for S(0-1)
- Details of materials and any fittings used. D(0-1) [4]
- 5 (a) Method of support: torch body is 'sandwiched' between the sides of the stand. Method must include practical details. S(0-3)
- Method of tilt includes use of pivot pins and locking by means of nuts and bolts/screws. T(0-2)
- Method must allow for quick and easy release from stand. Q(0-1)
- Allow alternative practical designs that do not use the given outline. [6]
- (b) Details of any appropriate control system/manufacturing process. CS(0-3)
- Accuracy of technical details. TD(0-1) [4]

Mark Scheme 1956/03
June 2007

1	(a)	(i)	Acrylic, polycarbonate, polystyrene.	[1]
		(ii)	Easy to work with/shape, not difficult to fix/bond together, different colours available, won't scratch the glass, quality edge.	[1]
	(b)		Any appropriate named saw, file, disc sander, vice, bench hook/sawing board, scribe/felt pen/chinograph pencil, try square, laser cutter. (Accept band saw, wet and dry) 1 + 1.	[2]
	(c)		Bonding/gluing, tensol adhesive, acrylic cement, rivets, machine screw & nut, self tapping screws (not screwing).	[1]
	(d)		Batch production.	[1]
	(e)		Template identified = 1 use/suitable material/drawing round ie detail = 1.	[2]
	(f)		Rounded edges/ends, finger grips, textured surface for grip, additional material to stop hand slipping forward when in use. Solution = 1 detail = 1.	[2]
			Total	[10]
2	(a)		Housing shown in correct position = 2 limited detail/accuracy = 1 (accept any housing).	[2]
	(b)		Knock down fitting, stub mortise and tenons screwed, glued and pinned, dowel joints, biscuit, butt joint (needs pins/screwed and glue) (Not comb/finger joint)	[1]
	(c)		1 Try square, marking gauge (accept mortise gauge) marking knife, pencil, ruler, tape measure.	[1]
			2 Tenon saw, dovetail saw, backsaw, chisel, mallet, router, power router. (Do not accept file/saw).	[1]
	(d)		We are looking for "cutting out" not "marking out". cutting out as a pair, use of jig, guide, CNC router, CAM.	[1]
	(e)		Size of books, different size of books, number of books, where it is to be located, other furniture in location, situation/user needs, knock down/relocation needs. Suitable materials if qualified. Any valid 2 x 1.	[1] [1]
	(f)		Lipping on back of shelves, thin board backing, height adjustment of shelves, ability to be dismantled/flat packed, extendable/expandable design, modular design. Idea = 1 detail/explanation = 1.	[2]
			Total	[10]

- | | | | |
|---|--|--------------|-------------|
| 3 | <p>(a) Steel, stainless steel, brass, aluminium. (not copper). [1]</p> <p>(b) Ease of drilling, easier to hold/secure, increased safety, likely to be more accurate. [2]</p> <p>(c) (i) Tap (not tap holder). Max 1 mark if candidate understands but fails to specifically identify correct tools. [1]</p> <p style="padding-left: 20px;">(ii) Die (not die holder). Centre lathe. Max 1 mark if candidate understands but fails to specifically identify correct tools. [1]</p> <p>(d) Cup, pad, increased surface area. 1 for idea 1 for potential success eg will the pad fall off? Details should be provided [2]</p> <p>(e) Bent over at 90°, Tommy bar, flattened “thumb grip”, thread extended and wing nut/lock nut added, knurled surface, plastic coated for grip. Idea = 1 + details for up to 2 more marks. [3]</p> | Total | [10] |
| 4 | <p>(a) Focus CAD <u>not</u> CAM</p> <p>Improved speed of designing, ease of making changes and adjustments to the design, cost effective in certain situations, CAD provides virtual image for early 3D evaluation, ease of storage. Design can take place at different facilities, encourages diversity, total compatibility of manufacturing processes to product. Electronic data easily transferred.</p> <p>Note: one design – multiple make.</p> <p>2 x 1 mark for different points. [2]</p> <p>(b) Speed of production, quality of finish/requires minimal finishing, work piece does not need securing, multiple items can be cut at same time ie batch production, machinery can be used for other materials, accuracy of cutting out/consistency.</p> <p>One word answers accepted if appropriate
2 x 1 mark for different points. [2]</p> <p>(c) Initial set up costs for machine, staff need additional training, different safety requirements, fumes as opposed to dust. [1]</p> <p>(d) Product meets all provisions of relevant legislation implementing certain European Directives/access to European market to sell products/free movement of product within Europe. Conformité European. Standards or European acceptable on its own. (Europe/standard/legal).
Mark for product meeting certain European legal standards. [1]</p> <p>(e) Product tracking/quality control/stock control/fast till activation and totalling/re-ordering of stock-materials/accuracy in manufacturing/retailing. 0-2 detail & understanding. [2]</p> <p>(f) Customer involvement, collection of waste products, viability of process, [2]</p> | | |

purity of batch for recycling/costs incurred needing to be met or passed on.
 Taken time/time consuming
 Difficult to find locations for some products to be recycled.
 Finding space to store the items
 Distance to recycling points

Any 2 x 1 mark for different points.

		Total	[10]
5	(a) Welding, accept Brazing.		[1]
	(b) Scroll.		[1]
	(c) Triangulation support, stop gate sagging, strengthening frame, stopping skewing of frame, brace.		[1]
	(d) <i>Decorative</i> finial/cap, protection of end grain/water ingress/insect infestation/excessive drying out with sun/wind. (Not safety)		[1]
	(e) Protection/stop rusting, aesthetic improvements, change colour to suit door/window/environment etc 2 x 1 mark per different point.		[1] [1]
	(f) <ul style="list-style-type: none"> • Hung on right hand post • Appropriate hinge shown /described • Suitable latch shown • Details shown /described 	(4 x 1)	[4]
		Total	[10]
		Total marks	[50]

Mark Scheme 1956/04
June 2007

1 (a) Focus CAD not CAM

Improved speed of designing, ease of making changes and adjustments to the design, cost effective in certain situations, CAD provides virtual image for early 3D evaluation, ease of storage. Design can take place at different facilities, encourages diversity, total compatibility of manufacturing processes to product. Electronic data easily transferred.

Note: one design – multiple make.

2 x 1 mark for different points.

[2]

- (b) Speed of production, quality of finish/requires minimal finishing, work piece does not need securing, multiple items can be cut at same time ie batch production, machinery can be used for other materials, accuracy of cutting out/consistency.

One word answers accepted if appropriate

2 x 1 mark for different points.

[2]

- (c) Initial set up costs for machine, staff need additional training, different safety requirements, fumes as opposed to dust.

[1]

- (d) Product meets all provisions of relevant legislation implementing certain European Directives/access to European market to sell products/free movement of product within Europe. Conformité European. Standards or European acceptable on its own. (Europe/standard/legal).

Mark for product meeting certain European legal standards.

[1]

- (e) Product tracking/quality control/stock control/fast till activation and totalling/re-ordering of stock-materials/accuracy in manufacturing/retailing. 0-2 detail & understanding.

[2]

- (f) Customer involvement, collection of waste products, viability of process, purity of batch for recycling/costs incurred needing to be met or passed on. Taken time/time consuming
Difficult to find locations for some products to be recycled.
Finding space to store the items
Distance to recycling points

Any 2 x 1 mark for different points.

[2]

Total [10]

2	(a) Welding. Accept Brazing.	[1]
	(b) Scroll.	[1]
	(c) Triangulation support, stop gate sagging, strengthening frame, stopping skewing of frame, brace.	[1]
	(d) <i>Decorative</i> finial/cap, protection of end grain/water ingress/insect infestation/excessive drying out with sun/wind. (Not safety)	[1]
	(e) Protection/stop rusting, aesthetic improvements, change colour to suit door/window/environment etc 2 x 1 mark per different point.	[1] [1]
	(f) <ul style="list-style-type: none"> • Hung on right hand post • Appropriate hinge shown /described • Suitable latch shown • Details shown /described 	 (4 x 1) [4]
	Total	[10]
3	(a) Larch, Douglas Fir (Columbian pine/Oregon pine, Yellow/Red deal (Northern or Scots pine, Sitka Spruce, Sequoia Pine/redwood/red pine/Californian Pine. Pine, pitch Pine, White Deal/Whitewood/Parana Pine/Western Red Cedar/Hemlock/Cedar (Do not reward Yew)	[1]
	(b) Mortice & Tenon (through/stopped/haunched/stub/stump - all acceptable) Dowelled, halving joint.	[1]
	(c) Steel rusts, will not last long, will need replacing, rust streaks mark the wood, hinge will not function correctly when rusty, noisy when rusty.	[1]
	(d) (i) Readily available, do not have to make them, available in range of styles/sizes/shapes, cost effective, save time (money) over the manufacture. Consistency of components.	[1]
	(ii) Difficulty in matching up at later date, style/size/material not available/not suitable, suppliers/retailers do not always stock - replenish stock/too many in pack (any combination of this), quality of components, not having the right tools.	[1]
	(e) <ul style="list-style-type: none"> • Are the door/s held when in the closed position (does it work?) • Are they secure? • Prevented from swinging inwards? • Details of the method used • No use of pre – manufactured components 	 (5x1) [5]
	Total	[10]

- 4 (a) (i) Design 2 would be cheaper to produce. (Only one correct answer) [1]
- (ii) Reference to the 1.5mm thick aluminium frame: only one mould/former would be required, components are the same so no mix ups during assembly, less work to produce the mould(s), 0-2 for understanding and detail. [2]
- (b) **F** Suitable method of fixing the frame to base A. (1.5 mm to 4mm aluminium). Epoxy resin, rivet, machine screw (nut), self tapping screw, welding
- Method = 1 Details of the proposed solution = 1
- B** Suitable method of fixing base A to base B (4mm aluminium to 15mm plywood). Wood screw, machine screw, rivet.
- Method = 1 Will it rotate? = 1
- S** Washer or spacer between base A and base B. = 1 [5]
- (c) Method of stopping (will it work) – 1 mark
quality of solution - 1 mark
- Crimping/bending of part of the frame, indentation, details of sawing/clipping/bending, addition of “lump” to form a stop ie rivets head, machine screw. [2]
- Total** [10]
- 5 (a) (i) • It needs to withstand rough treatment in factory environment.
• It needs to withstand a certain amount of mistreatment.
• It needs to be robust enough to resist forced entry to key box.
- Any appropriate “extended and valid” reasoning = 1 mark. [1]
- (ii) • Speedy removal in working environment.
• Avoid confusion/mix up with keys.
• Should not affect efficiency of workplace.
• Avoids worker frustrations.
•
- Any appropriate “extended and valid” reasoning = 1 mark. [1]
- (iii) Any appropriate specification point which is “extended and valid” reasoning = 1 mark. (Question 5 is an A* question and should get more demanding). Candidates need to work for the marks now ie Must be cheap to make **not** acceptable. Not referenced to wall fixings.
- Ensure correct keys easily identified. [1]
• Easy to open close the key box.
• Indication of key usage.

- Indication that key box is open/closed. [1]
- Secure method of key handing.
- Restricted positioning of keys/certain keys.
- Appropriate colour to easily locate the key box.
- Possible alarmed if tampered with.

Possible time lock to coincide with working hours in factory.

- (b) (i) Must make operation of the key easier for a disabled or elderly person; improved surface area/better grip/ wider area to hold.

Is it easy to attach?

Is it easy to detach? Must have evidence to support this.

Reference made to production in quantity reflected in design.
(4x1)

[4]

- (b) (ii) Understanding required for reward of marks. Must be related to their design and have appropriate materials selected and associated manufacturing process identified.

If just process identified ie Injection molding no marks 0 -2.

[2]

Total [10]

Total marks [50]

**General Certificate of Secondary Education
Design & Technology: Resistant Materials (Short Course) 1056
June 2007 Assessment Series**

Component Threshold Marks

Component	Max Mark	A	B	C	D	E	F	G
Paper 1	50			30	25	21	17	13
Paper 2	50	29	24	20	15			
Coursework	105	81	69	57	46	35	25	15

Syllabus Options

Foundation Tier

	Max Mark	A*	A	B	C	D	E	F	G
Overall Threshold Marks	175				90	76	62	49	36
Percentage in Grade					20.9	13.9	23.2	16.3	12.4
Cumulative Percentage in Grade					20.9	34.9	58.1	74.4	86.8

The total entry for the examination was 252

Higher Tier

	Max Mark	A*	A	B	C	D	E	F	G
Overall Threshold Marks	175	136	119	102	85	67	58		
Percentage in Grade		8.5	12.8	23.4	26.6	19.1	7.5		
Cumulative Percentage in Grade		8.5	21.3	44.7	71.3	89.4	96.8		

The total entry for the examination was 141

Overall

	A*	A	B	C	D	E	F	G
Percentage in Grade	3.6	5.4	9.9	23.3	15.7	16.6	9.4	7.2
Cumulative Percentage in Grade	3.6	8.9	18.8	42.2	57.9	74.4	83.9	91.0

The total entry for the examination was 393

**General Certificate of Secondary Education
Design & Technology: Resistant Materials (Full Course) 1956
June 2007 Assessment Series**

Component Threshold Marks

Component	Max Mark	A	B	C	D	E	F	G
Paper 1	50			30	25	21	17	13
Paper 2	50	29	24	20	15			
Paper 3	50			30	25	21	17	13
Paper 4	50	33	28	24	19			
Coursework	105	81	69	57	46	35	25	15

Syllabus Options

Foundation Tier

	Max Mark	A*	A	B	C	D	E	F	G
Overall Threshold Marks	175				95	79	64	49	34
Percentage in Grade					27.0	25.5	20.6	14.2	7.4
Cumulative Percentage in Grade					27.0	52.4	73.0	87.2	94.6

The total entry for the examination was 13077

Higher Tier

	Max Mark	A*	A	B	C	D	E	F	G
Overall Threshold Marks	175	138	121	104	88	70	61		
Percentage in Grade		9.0	23.4	31.1	22.0	10.6	1.9		
Cumulative Percentage in Grade		9.0	32.4	63.5	85.5	96.2	98.1		

The total entry for the examination was 13231

Overall

	A*	A	B	C	D	E	F	G
Percentage in Grade	4.5	11.8	15.7	24.5	18.0	11.1	7.0	3.6
Cumulative Percentage in Grade	4.5	16.3	32.0	56.5	74.5	85.6	92.7	96.3

The total entry for the examination was 26308

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