OCR
RECOGNISING ACHIEVEMENT

GCSE

Design & Technology (Resistant Materials)

General Certificate of Secondary Education **GCSE 1956**

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

Report on the Components

June 2008

1956/1056/MS/R/08

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This report on the Examination provides information on the performance of candidates which it is hoped will be useful to teachers in their preparation of candidates for future examinations. It is intended to be constructive and informative and to promote better understanding of the syllabus content, of the operation of the scheme of assessment and of the application of assessment criteria.

Reports should be read in conjunction with the published question papers and mark schemes for the Examination.

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REPORTS ON THE COMPONENTS

Chief Examiner's Report

The vast majority of candidates attempted all the questions on Papers 1-4. Candidates appeared to have sufficient time in which to answer the questions. As in previous years there was great variation in the quality of response. There were some excellent answers to the design-type questions in all four papers.

There are, however, areas of the specification content where examiners felt that candidates could improve. Some of these areas are basic to this specification and include:

- properties of materials and their working characteristics;
- the use of correct technical terms for tools and processes;
- practical knowledge and understanding of CAD-CAM;
- quality of communication, in terms of clarity of 2D and 3D sketches and annotation;
- an understanding of those factors that affect manufacturers and consumers;
- an understanding of the marks allocated to each question in brackets [ ] in terms of the detail, depth or number of points to be made by candidates.

In addition, the general level of response to the themed question in Papers 3 & 4 was the poorest since the themed question was introduced. It was particularly disappointing since the products to be studied were items of equipment with which candidates should have been familiar through their practical workshop activities, i.e. electrically operated drills.

There was a wide range of coursework projects undertaken although there were only a minority of projects using the starting point of individual recognition of a real design opportunity for a specified client or user group. Most coursework folders covered the assessment objectives on 25-30 sheets of A3 paper.

There were several issues connected with the administration of the coursework:

- some centres made transcription errors with candidates receiving the incorrect total of marks for their coursework;
- an increase in the number of CSF forms not being sent to moderators;
- a lack of internal standardisation where two or more teachers deliver the specification.
- the marking criteria is evidence-based and work must be present in the portfolio for marks to awarded.

Comments on specific objectives

Objective 1 should be completed concisely on one or two sheets of paper, clearly identifying the need or problem and the user group for which the product is intended.

Objective 2 included some good product analysis of existing or similar products and an improvement in the quality of the specification, especially making reference to the control system needed for batch production. Many candidates still fail to record essential basic information relating to the sizes of objects to be stored or size of children when designing furniture to be used by them. There was very little evidence of candidates summarising their research effectively.

Objective 3 included design ideas of variable standards in terms of innovation and presentation. More candidates are producing at least one design idea using CAD. The weakest part was often in the evaluation and final choice of design idea assessed against their specification.

Objective 4 contained a lot of irrelevant information about materials and constructions without direct reference to the product they are designing. Often there was no mention of the control system to be used in batch production or to pre-manufactured components that candidates would need when making their product.

Objective 5 planning was variable with only the best including quality control checks and health and safety considerations. The majority of products were made using wood but there was some excellent work in plastics and metal. The size of the product must be considered in terms of the candidate's ability, cost and storage.

Objective 6 appeared to be attempted at the last minute for many candidates. Often evaluations were superficial with little or no meaningful testing and consideration of the user group. Centres were often generous in the marking of this work.

The marks for Presentation were generally allocated fairly with reward for the logical arrangement of the folio work.

1056/03 Coursework

Principal Examiner's Report

General Comments
The vast majority of candidates attempted all of the questions and were able to gain marks throughout the paper. There was, once again, clear evidence of very good time management by most candidates. However there was a sharp increase with candidates failing to respond to questions or part questions and this was also noted with the pre-release themed question which is a worrying fact.

It must also be noted that there was a drop in the quality of both written and graphical communication which hindered candidates expressing what they knew and understood.

There are areas of the specification where candidates could show improvement, including:

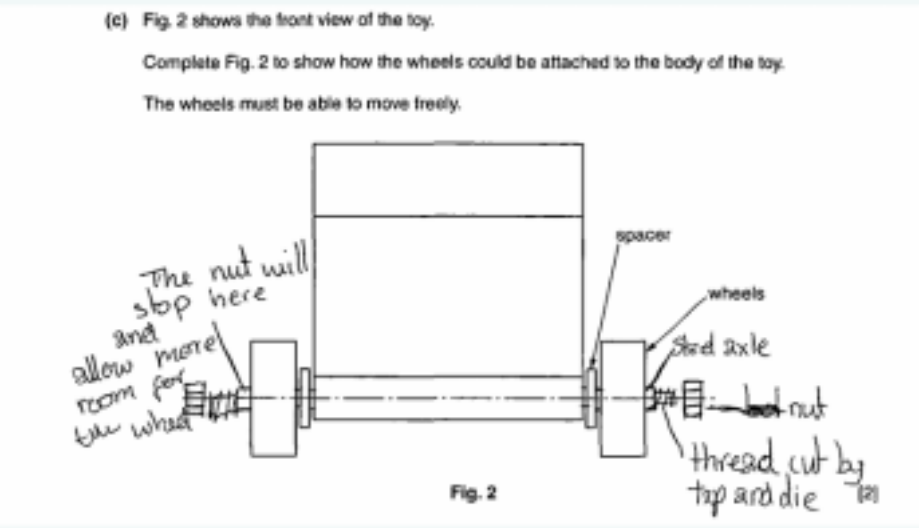
- improved communication skills including basic 2D and 3D sketching and the written word
- knowledge of correct technical terminology for tools and processes
- knowledge of basic properties and working characteristics of commonly used resistant materials
- knowledge and understanding of the factors effecting manufacturers and those which effect consumers
- knowledge and understanding of CAD, CAM and other applications which could be used in the design process
- understanding and using the mark allocation to questions e.g. [1] or [4]

Comments on Individual Questions

1 (a) Well answered with the most popular reasons being 'easy to work with' and quality surface when painted'.
Many candidates stated that MDF was 'cheap' which is not a rewardable response.

(b) A very good range of appropriate tools were given. Many candidates identified an appropriate saw but some failing to gain a mark for stating hacksaw which is seen as inappropriate. Many candidates identified correct marking out tools which, pleasingly often included a marking gauge.
As with previous papers both sandpaper and glasspaper were rewarded.
The most common incorrect response was once again "saw".

(c) Many candidates failed to gain the full to marks for this simple design based question.
Most candidates were content to identify some form of axle with often no consideration of how the wheels would fix to the axle or of allowing the system rotate.
A quality response is shown below.



(d) The majority of candidates gained a mark for this part of the question with a significant number gaining both marks.

(e) Precautions related to making and using the toy were rewarded. The majority of candidates gained the mark for this question.

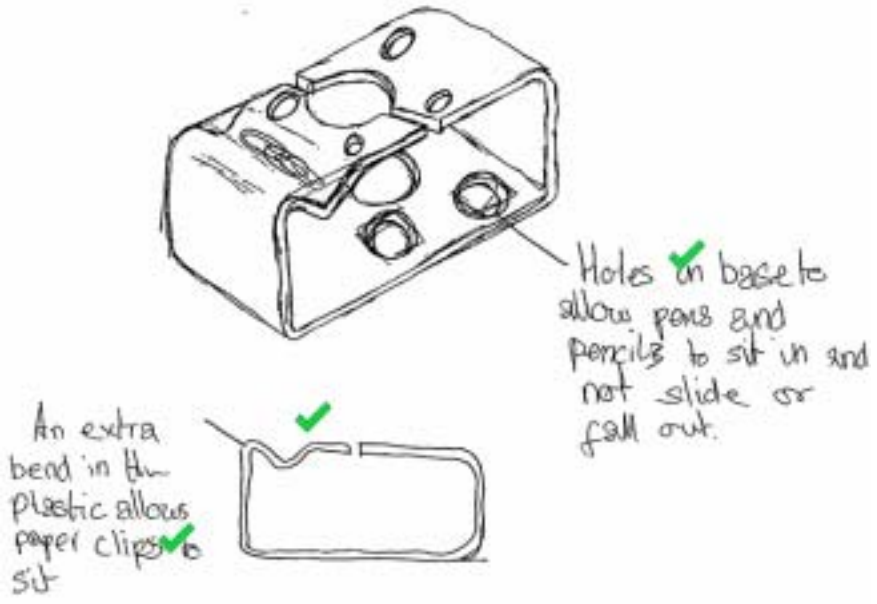
2) (a) (i) The majority of candidates correctly identified a suitable plastic. The most common answer was acrylic. Trade names, for example Plexiglas, were also rewarded if correct.
The most common incorrect responses were thermoplastic or thermosetting plastic.

(b) (ii) There were some excellent reasons given for the various specific plastics identified in part (i) including range of colours available, self coloured, high quality finish and ability to be cleaned easily.
The most common incorrect response was that the plastic was ‘cheap’ which, again, is not seen as a rewardable response.

(c) There was good understanding shown by candidates to this part of the question with the fact that the pre-formed desk tidy could be damaged / or crack when pressure was applied if drilled after the bending had taken place.
The simple fact that it would be easier, for a number of reasons, was the most common correct answer.

(d) The majority of candidates correctly identified batch production as the correct production method for making 25 desk tidies but with a significant number of candidates clearly having little understanding of this area of the specification.

(e) Candidate lack of graphical communication hindered a significant number of them expressing their ideas for this part of the question. Many candidates failed to demonstrate any discerning modifications to the desk tidy to meet the requirements of the question.

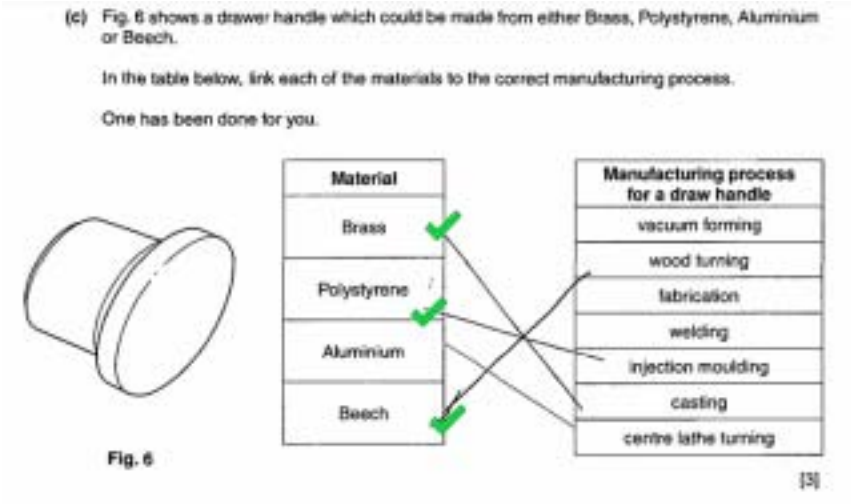


The majority of candidates addressed the issue of the pencils sliding / falling out of the holder but far fewer successfully addressed the issue of storing paper clips as has been successfully accomplished in the example above.
A through hole would still allow the pencils to fall through and so could not gain the two marks available for this part of the question.

3 (a) A butt joint or a dowelled joint were the two most popular correct answers to this part of the question. Incorrect responses included other wood joints which were inappropriate for example ‘mortise joint’ and a significant number of made up names such as ‘corner joint’ and ‘friction joint’.

(b) PVA was the most often stated correct answer whilst “wood glue” was the most common incorrect answer.

(c) Candidates had no problems whatsoever in dealing with the new format for this question.


(c) Fig. 6 shows a drawer handle which could be made from either Brass, Polystyrene, Aluminium or Beech.

In the table below, link each of the materials to the correct manufacturing process.

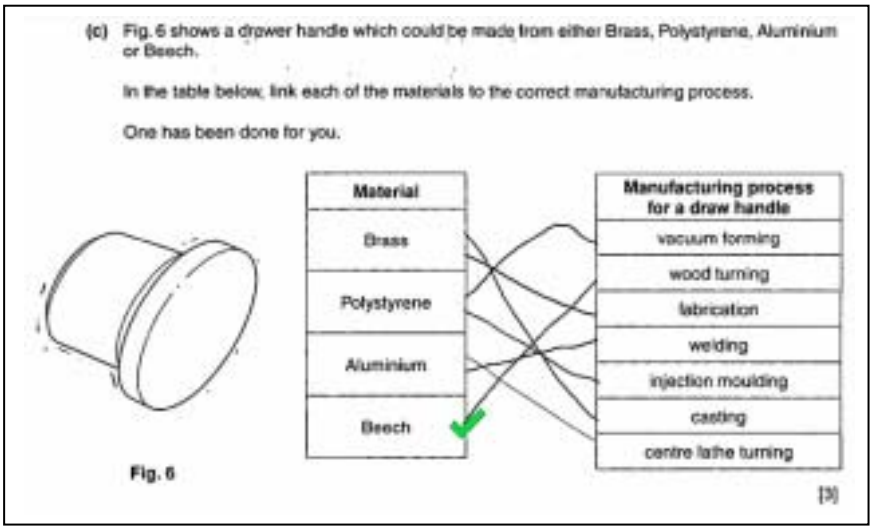
One has been done for you.

Material	Manufacturing process for a draw handle
Brass	vacuum forming
Polystyrene	wood turning
Aluminium	fabrication
Beech	welding
	injection moulding
	casting
	centre lathe turning

Fig. 6

[3]

1956/03 Paper 3 (Foundation)



Multiple responses were not rewarded.

The majority of candidates gained the mark for correctly linking “beech” with “wood turning” but technical knowledge of the processes associated with “polystyrene” and “injection moulding” and “brass” and “casting” were much less evident.
The most common incorrect link was that of “polystyrene” with “vacuum forming”. The use of vacuum forming would be inappropriate for the focused product i.e. the drawer handle.

(d) This part of the question was not answered at all well by the majority of candidates. Many of whom seemed happy to offer the minimum of information / detail to address the problem set. There was little evidence of how the “fixture” to support the drawer might be shaped or profiled, affixed to the cabinet or the relationship of the fixing / runner with the drawer.

The second part of the problem of how to “stop” the drawer going too far was even less well answered that the first part. A number of candidates were content to state “there would be a stopper” or draw a “blob” neither of which can gain any marks because they just lack detail.

The most common correct response to this part of the problem was that of widening the front of the drawer thus restricting its movement into the cabinet.

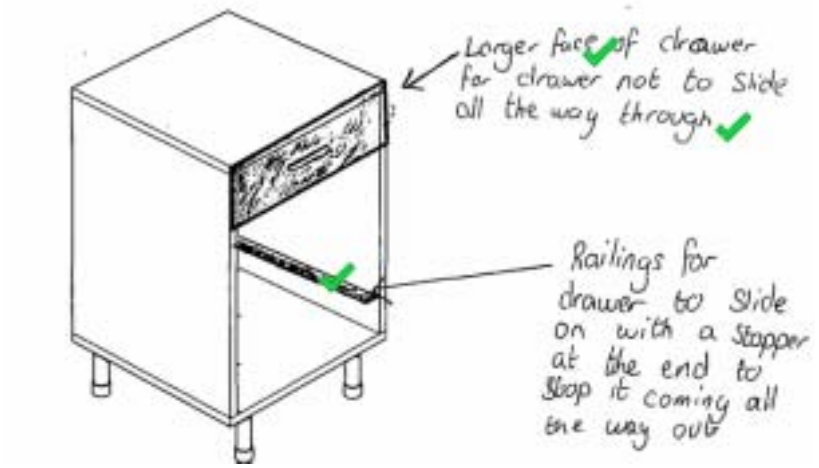
Candidate inability to communicate graphically often hindered their ability to express their thinking.

A key point is also that candidates failed to use the guidance of the marks for each part of the question. If a question has [4] marks then candidates should be prepared to offer four facts or pieces of information to gain those marks.

Use sketches and notes to show how you would support **one** of the drawers so that it:

- is able to slide in and out;
- does not go too far inside the cabinet.

You should include details of all materials and fixings.



4 (a) The most common correct answer was the use of CAD with the use of CAM being the most common incorrect answer. A number of discerning candidates managed to clearly explain the link between the two to assist with designing i.e. prototyping, to gain the second mark.
Simulations, testing, virtual stacking were all very good responses showing good understanding of the use of ICT during the **design** activity

Responses such as “to design the back” of the chair could not be rewarded.

(b) The use of the internet and emailing customers, together with creating T.V adverts and posters were the most common correct responses.
There were a significant number of incorrect responses with candidates failing to read the question thoroughly and so giving incorrect details.

(b) State **two** ways in which computer technology could be used in the marketing of the stacking chair.

1 Could show what the product looks like
2 Be used during the makings on the product [1]

(c) Not having to employ “extra” workers, time saving, easier **(not easy)** to store or transport were the most popular correct answers to this part of the question. In general it was well answered with candidates showing good understanding relating to a manufacturer.

(d) Not having the problems (hassle), not needing to have / get tools and the fact that less time would needed to be spent were the most popular responses alongside the important fact that a product could be used straight away.
A smaller number of candidates failed to grasp the fact that the product was already assembled and gave reasons associated with flat pack products. These responses could not be rewarded.

(e) Most candidates gained at least one mark here for some basic understanding of quality control but a significant number failed to gain the second mark by explaining that tests, sampling or monitoring against a standard or specification are essential elements of quality control.

There were a number of candidates who just re-worded the question and talked about “checking of products for quality” which failed to gain reward.

5 This is the Themed Question with pre-release materials being sent to centres prior to the examination.
It is very disappointing to report that this was the most poorly answered themed question since this specification started in 2003. Clearly a significant number of candidates had not had sufficient support and coaching for this themed question. The theme was one specifically related to the practical nature of resistant materials and so, by nature should have been well within the general body of knowledge of candidates for over half of the question content.

(a) Chuck or keyless chuck were the two correct answers but with only some 70% of candidates gaining the mark. “Thingy”, “drill grabber” and “holder” were amongst a surprising number of incorrect responses.

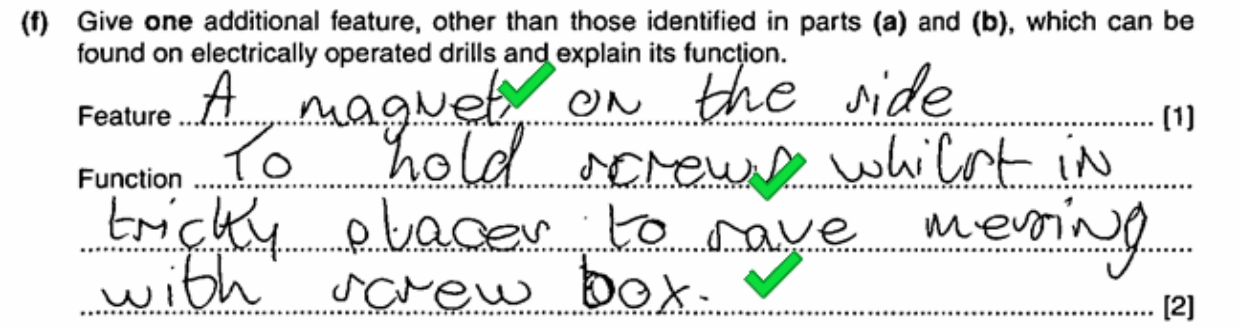
(b) A depth stop or to stop you drilling too far was the correct response.
To steady the drill, to hold onto and a laser were amongst the most common incorrect answers.

(c) This part of the question was well answered with understanding of the comfort of ‘holding the drill’ with the handles and also the position of the trigger in relation to the handle being the most common correct answers.
There were a range of other features given which had no ergonomic connection at all.

(d) Being lightweight and not conducting electricity were the two most common correct answers. A good number of candidates understood the fact that the material could be moulded into the complex shapes and also that there was less of a “heat” problem when using a plastics material rather than a metal.
It was a common misconception that the material is **easy** to mould or shape.

(e) This part of the question was generally better answered with some astute observations made by a number of candidates. Being portable and taken anywhere, capable of being used where there was water and not needing to be close to an electrical socket were the most common correct answers.
Safer (a statement which always needs qualification) because you won’t trip on the cable, drill through the cable or get mains electric shock were seen as very good responses

(f) Many additional features were identified by candidates which included the hammer action, the reverse switch and torque control. Most candidates gained a mark for correctly identifying a feature and the majority of those gained a second mark for an explanation.
The more able candidates fully explained and so gained the third mark.


(f) Give **one** additional feature, other than those identified in parts **(a)** and **(b)**, which can be found on electrically operated drills and explain its function.

Feature A magnet on the side [1]

Function To hold screws whilst in tricky place to save messing with screw box. [2]

The most common problem was where candidates identified a component, e.g. the motor, rather than a feature of the electric drill. These were not rewarded.

1956/04 Coursework

General Comments
The vast majority of candidates attempted all of the questions and were able to gain marks throughout the paper. There was, once again, clear evidence of very good time management by most candidates. However there was a sharp increase with candidates failing to respond to questions or part questions and this was also noted with the pre-release themed question which is a worrying fact.

It must also be noted that there was a drop in the quality of both written and graphical communication which hindered candidates expressing what they knew and understood.

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- understanding and using the mark allocation to questions e.g. [2] or [6]

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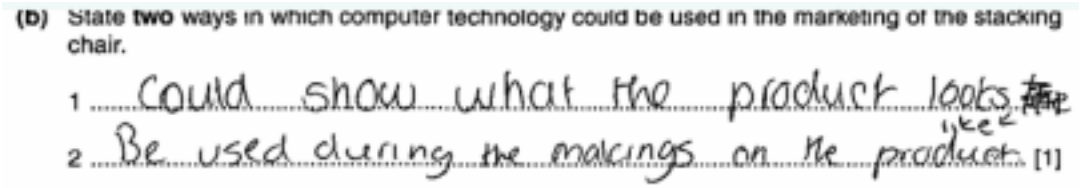
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(f) Give **one** additional feature, other than those identified in parts **(a)** and **(b)**, which can found on electrically operated drills and explain its function.

Feature A magnet on the side

Function To hold screws whilst in tricky place to save moving with screw box.

The most common problem was where candidates identified a component, e.g. the motor, rather than a "feature" of the electric drill. These were not rewarded.

3 (a) The majority of candidates gained a mark for suggesting using acrylic paint or the use of coloured sticky backed plastic. A smaller number of candidates gave a good clear explanation of how the colouring might be achieved.

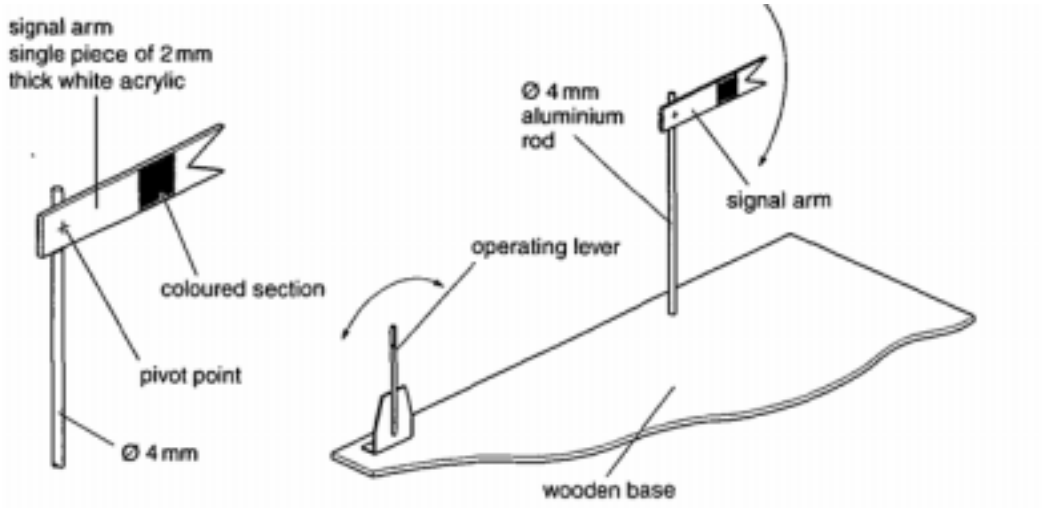


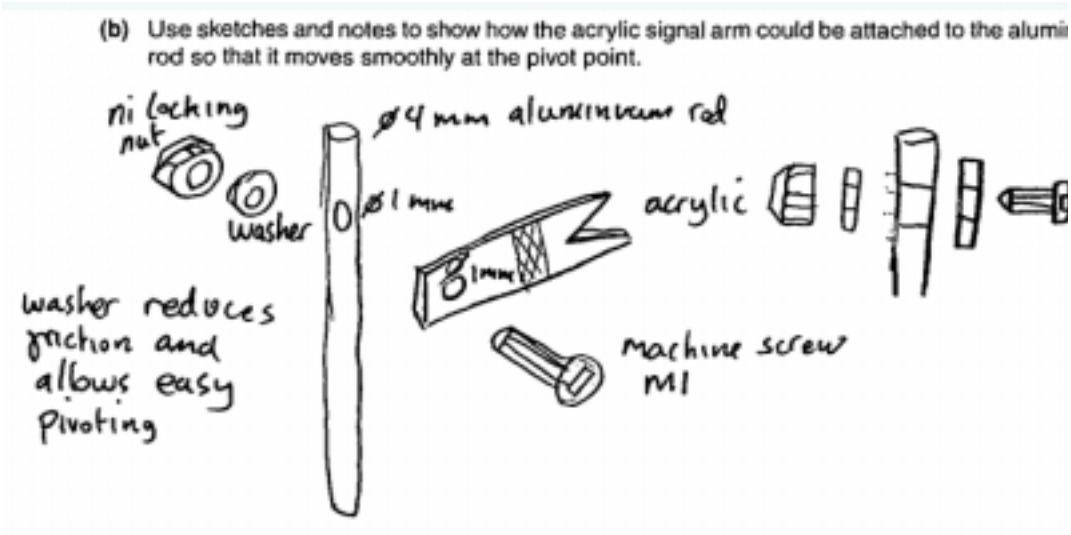
Fig. 3

(a) Explain how the coloured section on the white acrylic signal arm could be produced.

The acrylic could be laminated with a piece of coloured acrylic and secured with tensol 12. [2]

1956/04 Paper 4 (Higher)

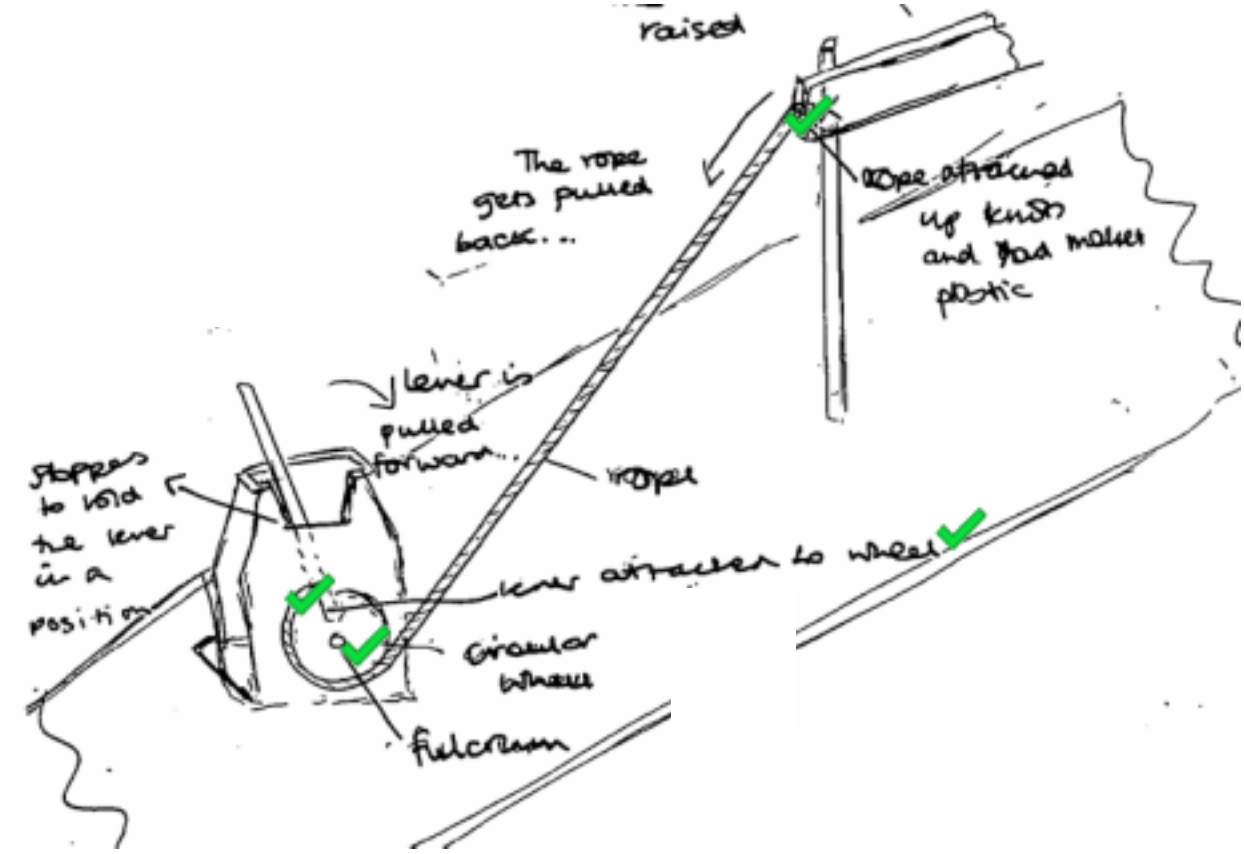
(b) Most candidates gained at least one mark for this part of the question but the lack of details precluded the award of the second mark in many cases.
Again, the reference to the marks available is the key to success for all candidates.
A very good response is shown below.



(c) The drilling of a hole and securing with epoxy resin was the simplest and most common fully correct answer. There were a smaller number of other detailed methods shown which gained full credit.
The majority of candidates seemed satisfied with suggesting drilling a hole.
Reference should be made at all times by candidates to the marks available for any part of a particular question in this case [2].

(d) This question proved technically difficult for many candidates. The inability to communicate their thinking also handicapped many other candidates.
The question was about providing a pivot on the operating lever, some form of connection above or below the pivot to produce movement and then the appropriate conversion of that movement to move the signal arm.

Without a pivot, remembering clear clues were given in part b and the drawings of the signal system were given, operation / movement of the signal arm cannot be achieved.
An example of a fairly successful method is shown below.



A significant number of candidates who did suggest a pivot but then connected directly to the pivot which then provided no movement and so could not gain further marks.

4 (a) Relatively few candidates understood risk assessment and a significant number of responses related to damage to the work and in some cases the equipment which is not the focus of a risk assessment. The specific damage and injury is what was looked for and only the well informed and more able candidates gained marks for this part of the question.

(a) Complete the risk assessment table below identifying a **different** hazard and **different** control measure for each process or activity given.

Process/Activity	Hazard	Risk Assessment	Control measure
Drilling the hole for the axle in the side sections of the toy	Eye injury from flying wood chippings ✓	Medium	Clamp section whilst drilling and wear goggles ✓
Using a power router to make the slots in the side sections of the toy	Injury to hand or fingers by cutting ✓	High	Clamp wooden segment whilst routing and ~~drive~~ REP straight cutting. ~~Tie~~ Tie long hair back

[2]

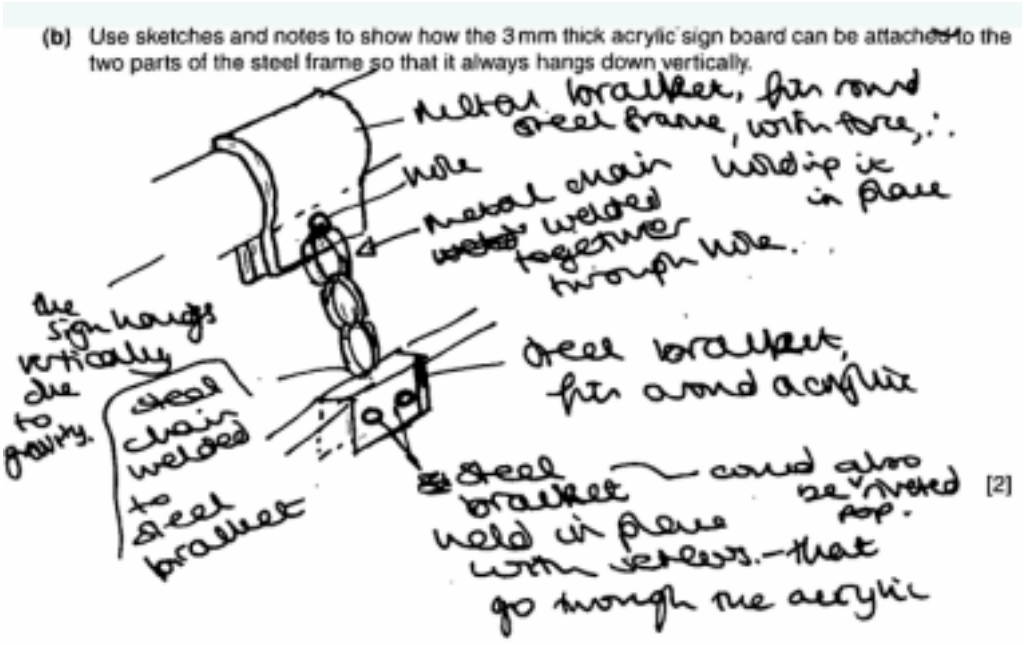
[2]

(b) This straightforward question was generally poorly answered. The lack of communication skills hampered many candidates and the failure to provide sufficient detail was a very common occurrence. Again the allocation of marks, in this case [6] needs to be addressed by candidates.

The example shown above is one of the few detailed responses provided by candidates to this question.
Generics such as “wood” and “metal” cannot be rewarded under ‘details of materials’.

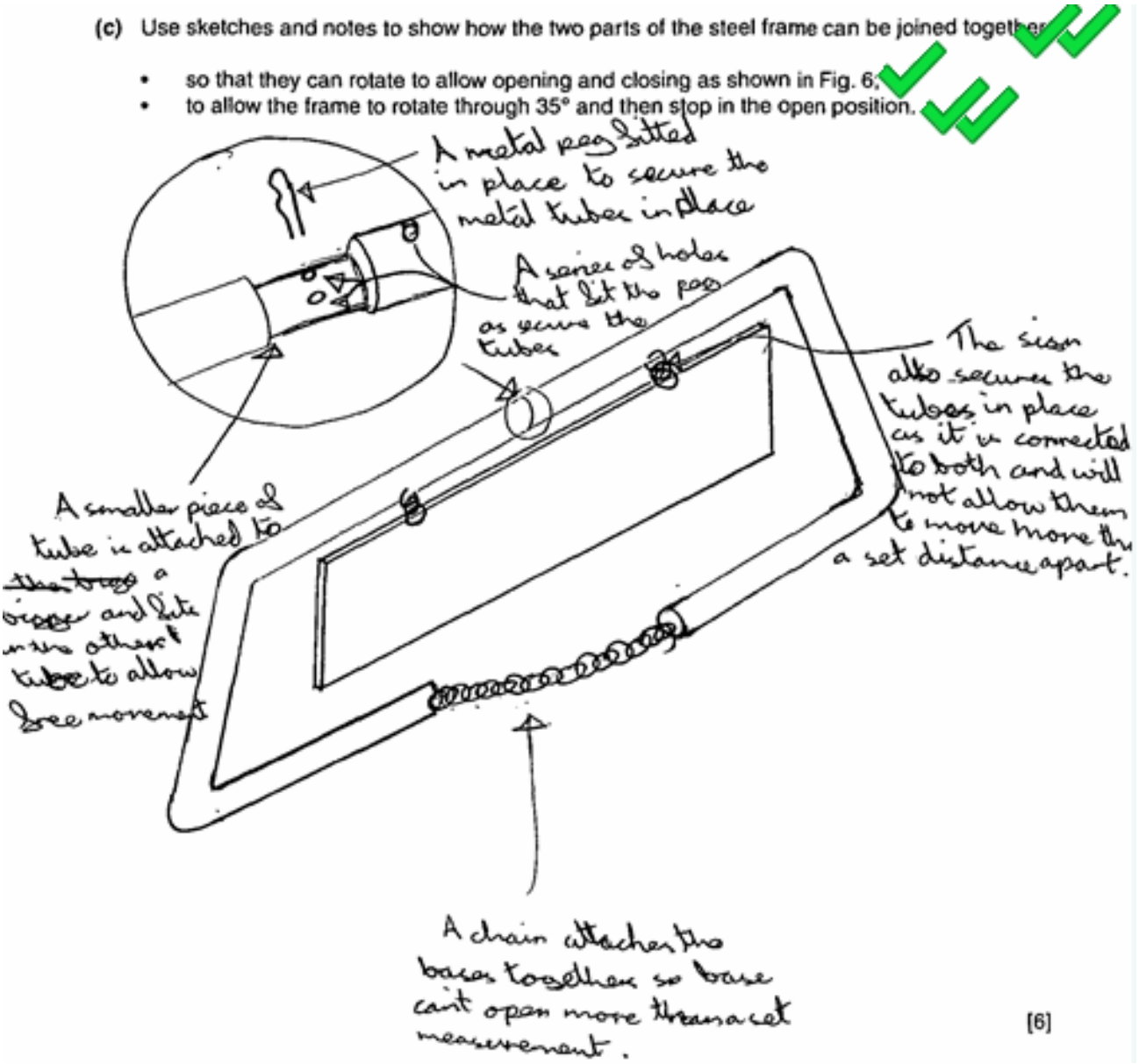
5 (a) The lack of knowledge of the properties of steel was striking. The fact that is will not rust and is **easy** to bend were the two most common incorrect responses. Ability to be bent to desired shape, heavy so will not be blow over and resistance to damage were the most common correct responses.

(b) The majority of candidates gained at least one mark for this simple design problem



A small number of candidates suggested string or rope which were not seen as Resistant Materials solutions to the problem set.

(c) This part of the question was, in general, addressed in more detail than in previous examination sessions by a good number of candidates. By design, a challenging question, it required thought and ingenuity and the consideration of appropriate materials and sizes.



The question required consideration of joining the sections together, rotation when joined and also the restriction of the rotation at a set point. Many candidates only considered one or two of these points and so did not gain the full marks. Lack of detail, as in the example above of how the chains would be attached to the sections also restricted some candidates. The example does show good consideration of joining the two sections and to a lesser extent the rotation has been addressed.

1956/05 Coursework

There are now only two more cohorts of candidates who will have the opportunity to take this examination. The new modular specifications in Design and Technology will be available to start teaching from September 2009. OCR will be running a programme of new specification training sessions from September 2008.

General comments and observations from the coursework component

The majority of centre marking was correct and within the tolerance set by OCR. There were however, a significant number of centres who award marks for work that was missing from the coursework portfolio. The marking criteria is evidence based and work must be present to obtain the allocated mark(s). There also appeared to be a generous application of marks in the middle band of candidates on the D / C grade thresholds. In these circumstances, moderators need to make the necessary adjustments to bring the centre in line with the agreed standards. There is a tolerance of plus or minus 4 marks on the coursework component before adjustments are made.

The centre is responsible for completing the paper work and submitting it on time. There were still far too many transcription errors with candidates receiving the incorrect total marks for the coursework component. There was a noticeable number of centres forgetting to send the completed CSF forms to moderators. Most of the centre authentication forms were made available during the moderation process.

Where there are two or more teachers teaching candidates from the same centre, it is very important that teachers standardize both the delivery and marking of the work candidates produce. It is vital that the centre produce a correct rank order of attainment for moderation. In a majority of cases this year, the ranges of practical outcomes were predictable and rather disappointing. It is important that candidates are given the opportunity and encouragement to be creative and actually design the product they wish to make. Very few candidates worked from the recognition of a real design opportunity for a specified client or group of potential users. Some centres combined the use of CAM with more traditional workshop skills enabling the candidates to use a range of tools, equipment and manufacturing processes which is the ideal approach.

The majority of coursework folders covered the requirements of the 6 assessment objectives using between 25 – 30 A3 sheets of paper. Some centres preferred to use A4 design sheets as they are easier to transport / store. There was a significant increase in the appropriate use of ICT.

Objective One

In the Resistant Materials specification, candidates are encouraged to complete this objective on one or two sheets of paper. Candidates need to identify a problem / opportunity, write a design brief for a marketable product and produce a user group profile which shows they have a good understanding of who they will be designing the product for. Moderators found that the user's needs, product expectations etc, were often very superficial and rarely went beyond two or three statements.

Objective Two

There was some good work in this section. Many centres are encouraging candidates to do full product analysis exercises on similar products where the key designing and manufacturing issues are analysed and discussed. However many centres allow candidates to rely on internet images for product analysis, resulting in a superficial investigation. Too many candidates still fail to carry out relevant and appropriate research which is vital to the success of their design work in objective 3. For example, the size and shape of jewellery items to be stored in decorative box or the average size and weight of toddlers if designing children's furniture. There was a noticeable improvement in the relevance and use of questionnaires. Specifications have improved and many now include the acknowledgement of a control system for batch production. Only the higher achieving candidates were able to summarise their research effectively.

Objective Three

The quality of the communication of ideas was variable. Quick design exercises were often used to kick start thinking based on natural or geometric shapes for inspiration. It was disappointing that many candidates failed to be inspired from this exercise and returned to making 'box' shaped CD racks or storage units. Some candidates used colour and most had attempted at least one CAD drawing. There was evidence of both card and computer modelling to generate possible solutions from the better centres. The evaluation of ideas was often superficial and rarely referred to the needs of the user or the specification. Higher achieving candidates were able to display problem solving skills through their drawings with clear annotation.
Some candidates still do not highlight their chosen idea and fail to check it against the specification generated in objective 2.

Objective Four

In this objective, it is important that the material testing and construction trialling all relates to the product the candidate is making, and as a result, decisions are being made and justified. Far too often moderators see pages of woodwork joints, properties of materials and possible surface finishes, but with no comments, conclusions or reasoned decisions made by the candidate. There is still a significant number of centres that make no reference to the construction and use of a control device during objective 5 or the purchase of pre manufactured components. Candidates should be encouraged to give full details about the final product – the size and shape of individual components, construction details etc, with any modifications that have occurred as a result of testing and trailing.

Objective Five

The planning, prior to making, varied considerably between centres. This section is worth 12 marks and should be given the necessary time to compete. High achieving candidates, using various means, communicated the proposed stages of manufacture, listed the tools and equipment, included quality checks at appropriate points and emphasised health and safety requirements which were all directly related to the construction of their product. However, far too often general statements about health and safety were made which had little or no relevance to the making of the product designed by the candidate. Where there is no planning in objective 5, between 0 and 3 marks can be awarded by the centre. The agreed procedure is as follows -
If the final outcome is assessed in box 1 ' low standard of outcome' then no marks are awarded. If the final outcome is assessed in box 2 ' reasonable standard of outcome' then 1 mark can be awarded. If the final outcome is assessed in box 3 ' good standard of outcome' then 2 marks can be awarded. If the final outcome is assessed in box 4 ' high quality outcome' then 3 marks can be awarded.

Candidates' realisations as always were largely wood based, although some exciting design work in metal and plastic was seen by the moderators. There was a marked increased in pewter jewellery casting and the use of silver soldering to join copper, brass and silver jewellery components. The design of acrylic lighting and clock designs continue to be popular. Some centres continue to make products of a large physical size but the majority of centres concentrate on projects which are easier to store and due to rising cost implications, less expensive to make. It is important that centres 'support' the candidate in the construction of the product. However, any direct adult intervention in the construction of the product must be clearly documented on the candidate authentication form,

Objective Six

Many candidates clearly attempt this objective at the last minute. Many evaluations were superficial and make little reference to the specifications. Only the higher achieving students thought about the product in terms of the user group and conducted detailed, relevant testing with meaningful conclusions. Many centres were too generous in the marking of this objective. Full marks cannot be awarded without an evaluation of the control method, with suggested improvements after use in the construction of the product in objective 5.

There are 5 additional marks available to the candidates for the presentation of their work. The best folios were logically arranged with clear headings and subheadings relating to the assessment criteria. This made both marking and moderation straight forward. In general most centres allocated the correct marks and the full range was used appropriately.

1056/01, 1956/01 Paper 1 (Foundation)

General comments
The majority of candidates attempted all the questions and achieved marks throughout the paper.

There are areas of the specification where candidates could show improvement, including:

- knowledge and understanding of technical detail involving the correct naming of tools and equipment;
- knowledge and understanding of processes when working with plastics, in particular line bending and vacuum forming;
- knowledge and understanding of K-D fittings and their application;
- the quality of sketching necessary to communicate design ideas effectively.

Comments on specific questions

Question 1

Many candidates achieved their highest mark for this question.

(a) Most candidates gave correct descriptions for the tools or items used to make the base of the clock. The weakest responses were to the template.

(b) The majority of answers gave ‘goggles’ as the safety precaution associated with a sanding machine.

(c) The method for producing the Ø60 hole proved difficult for many candidates. Most achieved a mark for stating ‘drill’ but only a minority named a hole saw or that it could be produced by first drilling a small hole, then remove a coping saw blade and insert it to cut out the hole.

(d) The most popular method of hanging the clock on a wall involved the use of a nail or screw. For many candidates the use of a nail or screw and the use of string achieved only one mark unless some provision was made on the back of the clock. There were some excellent answers showing clearly the use of keyhole slots and small brackets into which a screw head would fit.

Question 2

This question tested candidates’ practical knowledge of working with acrylic. Generally the results were disappointing.

(a) Most candidates drew the bend lines in the correct position.

(b) Most candidates understood that a chinagraph pencil would be better to use for marking out the plastic because the lines could be erased later, the marks would stand out more than those made by a scriber, or that a scriber would leave a permanent mark on the surface of the plastic.

(c) Three different stages in producing a highly polished edge gave candidates the opportunity to describe the use of a scraper, draw filing, wet and dry paper and polishing the edge using polishing compound and the buffing wheel. The question did not demand an accurate sequence of stages. Many candidates could not provide more than a file for the process with the use of wet and dry a rare response. Many candidates incorrectly chose 'sandpaper' to finish the edge.

(d) The plastic could have been heated using a strip heater, line bender or oven. While many candidates did name one of these, there were many answers involving the use of a blow torch and vacuum former.

(e) The vast majority of candidates did not know how a partition could be added to the letter rack. Partitions needed to have an increase in surface area so that they could be cemented successfully. Most methods given simply showed the plastic 'glued' in position. The use of Tensol Cement or the equivalent was very rarely seen.

Question 3

(a) **(i)** Many candidates drew a pear shaped, eccentric or snail cam as a suitable mechanism that would move the funnel of the train up and down.

(ii) Many candidates named 'cam' correctly.

(iii) Few candidates gave the correct term, 'reciprocating' for up and down movement.

(b) Most safety checks given included references to 'sharp edges' and 'choking hazards'.

(c) It was disappointing that the vast majority of candidates could not show practical methods for retaining a wheel on a Ø60 axle using a nut or a split pin, or the use of a washer to prevent the wheel from rubbing against the side of the train. These are basic temporary fastenings with which candidates should be familiar.

Question 4

(a) Most candidates named two CAD drawing tools. Some candidates recognised the programme used in the screen dump and correctly named tools specific to the programme such as 'grid lock'.

(b) The majority of candidates achieved one mark for stating that CAM could be helpful in batch production because of the repetitive accuracy of the process rather than describing part of the process itself.

(c) This question was very poorly answered. The question was in two parts: a design for a tray into which the puzzle would fit and details of a former used to vacuum form it. Many candidates drew trays that were totally unsuitable with no regard for the shape of the puzzle and most candidates could not provide details of a functional former. Only a minority described draft angles or rounded corners on the former.

(d) There were many sensible quality control checks that would be made when vacuum forming: the best referring to the need for the correct temperature when forming the plastic, visual checks after forming and testing for correct size.

Question 5

(a) Most candidates named two CAD drawing tools. Some candidates recognised the programme used in the screen dump and correctly named tools specific to the programme such as ‘grid lock’.

(b) The majority of candidates achieved one mark for stating that CAM could be helpful in batch production because of the repetitive accuracy of the process rather than describing part of the process itself.

(c) This question was very poorly answered. The question was in two parts: a design for a tray into which the puzzle would fit and details of a former used to vacuum form it. Many candidates drew trays that were totally unsuitable with no regard for the shape of the puzzle and most candidates could not provide details of a functional former. Only a minority described draft angles or rounded corners on the former.

(d) There were many sensible quality control checks that would be made when vacuum forming: the best referring to the need for the correct temperature when forming the plastic, visual checks after forming and testing for correct size.

1056/02, 1956/02 Paper 2 (Higher)

General comments

The majority of candidates attempted all the questions and achieved marks throughout the paper.
There are areas of the specification where candidates could show improvement, including:

- knowledge and understanding of processes working with plastics, in particular vacuum forming;
- knowledge and understanding of K-D fittings and their application;
- knowledge and understanding of technical detail when providing information about materials, constructions and fittings appropriate to successful design solutions;
- the quality of sketching necessary to communicate design ideas effectively.

Comments on specific questions

Question 1

(a) Most candidates named two CAD drawing tools. Some candidates recognised the programme used in the screen dump and correctly named tools specific to the programme such as 'grid lock'.

(b) The majority of candidates achieved one mark for stating that CAM could be helpful in batch production because of the repetitive accuracy of the process rather than describing part of the process itself.

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Question 2

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(d) There were many sensible quality control checks that would be made when vacuum forming: the best referring to the need for the correct temperature when forming the plastic, visual checks after forming and testing for correct size.

Question 3

(a) Very few candidates achieved maximum marks for this part. The best way to ensure that the bottom of the stand could rotate on the base was by using either a metal rod glued into the base, a ball race or using marbles in a groove. These were the most popular appropriate methods but many candidates were unable to secure maximum marks because of the poor quality of communication or that the details of the materials and fittings used were incomplete.

(b) Many candidates did gain marks for showing how the DVDs could be located. One method predominated the answers given: the use of grooves or housings into which the DVDs would sit. These were produced by either cutting the groove using a router or sawing and chiselling them by hand or by adding pieces of wood or plastic to provide the slot for the DVDs.

(c) There were some excellent sawing jigs shown that would be used to saw the central column to length. Unfortunately, many candidates confused 'jig' with 'template' and provided irrelevant details relating to repetitive marking out of part of the DVD stand.

Question 4

(a) The topic of annealing ferrous metals is a very technical area. Candidates were rewarded initially if they recognised that annealing involves the heating of the metal. Many candidates achieved this mark but the majority did not know what would be done to the metal when it reached the correct temperature.

(b) Many candidates were able to achieve at least one mark for indicating that the metal would be held in a vice, or that a former or the equivalent would be used to produce the shape, or that appropriate force by means of a mallet or hammer and scrap wood would be needed.

(c) Few candidates achieved maximum six marks for showing how the display boards could be made to swing apart within the mild steel bracket. However, there were many designs shown that had the potential for success but were lacking the essential technical detail. Some designs were based on a variation of a 'ring binder'. Other designs involved the use of additional fittings added to the display boards. This was necessary due to the thickness of the MDF boards being only 3mm. Candidates who accounted for this demonstrated a good understanding of part of the problem.

Question 5

At this stage of the paper a more open-ended design question provides an effective form of differentiation. It is recognised that candidates have limited time in which to respond to a design problem and this is reflected in the mark scheme. Few candidates achieved maximum marks for part **(b)** but as in the previous question, there were many designs that had the potential for success.

(a) Repetitive accuracy, cost effectiveness for large scale production and the ability to produce intricate shapes were the best benefits for manufacturers using injection moulding. Unfortunately, only a minority of candidates achieved maximum two marks. Often, answers such as ‘simple to use’, ‘cheap’ and ‘quick’ were given and these received no credit.

(b) The use of bullet points is aimed at helping candidates to focus on the key issues when tackling design-type questions. Many candidates still fail to address the bullet points and therefore deny themselves access to all the marks available. The most popular methods of adjustment involved the use of thumbscrews or the principle of a ‘belt’ with holes to provide the means for the device fitting different size jars. Grip was often self-evident with some form of ‘teeth’ or knurl provided. Many candidates demonstrated some understanding of ergonomics through the use of shaped handles with finger grips. The weakest element involved the technical detail upon which the practical success of the design depended.

Grade Thresholds

General Certificate of Secondary Education
Design and Technology (Resistant Materials) 1956
June 2008 Examination Series

Component Threshold Marks

Component	Max Mark	A*	A	B	C	D	E	F	G
01	50				25	21	17	14	11
02	50		26	21	16	11			
03	50				31	27	23	19	15
04	50		32	27	22	17			
05	105		81	69	57	46	35	25	15

Specification Options

Foundation Tier

	Max Mark	A*	A	B	C	D	E	F	G
Overall Threshold Marks	175				94	79	64	50	36
Percentage in Grade					27	25.6	21.4	13.4	7
Cumulative Percentage in Grade					27	52.7	74.1	87.5	94.6

The total entry for the examination was 11498

Higher Tier

	Max Mark	A*	A	B	C	D	E	F	G
Overall Threshold Marks	175	135	118	101	85	66	56		
Percentage in Grade		10.5	21.8	30.4	23	11	1.8		
Cumulative Percentage in Grade		10.5	32.3	62.7	85.7	96.8	98.6		

The total entry for the examination was 12517

Overall

	A*	A	B	C	D	E	F	G
Percentage in Grade	5.5	11.4	15.9	24.9	18	11.1	6.4	3.4
Cumulative Percentage in Grade	5.5	16.9	32.8	57.7	75.7	86.9	93.3	96.7

The total entry for the examination was 24015

Statistics are correct at the time of publication.

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