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 2006

1956/1056/MS/R/06

Oxford Cambridge and RSA Examinations

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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.

The reports on the Examinations provide 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.

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General Certificate of Secondary Education

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REPORT ON THE COMPONENTS

Chief Examiner's Report

All four exam papers were accessible to the vast majority of candidates. Candidates appeared to have sufficient time in which to answer all the questions. There were some excellent answers to the design type questions in all four papers. It was also pleasing to see an improvement in the answers to the themed question in Papers 3 & 4 with evidence of good product analysis activities being undertaken in conjunction with the pre-release material.

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;
- practical knowledge of the processes associated with a variety of resistant materials, including methods of joining;
- industrial practices, including commercial production methods, jigs and formers and quality control;
- quality of communication, in terms of clarity of 2D and 3D sketches and accuracy of technical terminology.

One of the disappointing features of this year's coursework appears to be the heavily structured approach by some Centres that denies candidates the opportunities to demonstrate their individualism and flair on a project. Centres are reminded that candidates need to take full responsibility for their own planning, designing and practical work. Centres need to be reminded of some of the key features of the Assessment Objectives.

- Objective 1 can be answered effectively on one sheet of A3 paper by describing clearly the nature of the product, the consumer and the situation in which the product would be used.
- In Objective 2 it is better to evaluate two existing products in detail than several in a superficial manner. The use of questionnaires is valuable only when the results are analysed and it is clear how they have informed the candidate's design thinking. Reference must be made to batch production in the specification.
- In Objective 3 many candidates produce a number of unconnected ideas from which one is chosen. Often there is little evidence of coherent designing. It is essential that a final design proposal is chosen as a result of an objective evaluation.
- The essence of Objective 4 is that candidates, having chosen a design, need to explain how it will be made. This should include the choice, for example, of materials, constructions, finish and pre-manufactured components.
- Thorough planning should be a key feature of Objective 5. There are 12 marks available. The best plans showed evidence of sub-dividing the process and planning two or three weeks in advance.
- In Objective 6 the product must be tested against the original specification. Bench top testing, in order to simulate the exact situation in which the product will be used, is acceptable.
- The marks for presentation are awarded for the logical way in which the stages of designing and making are shown.

1956/01 PAPER 1

General comments

The majority of candidates attempted all the questions and gained marks throughout the paper. There were many excellent answers to Question 1 where the majority of candidates achieved their highest marks. There are areas of the specification where candidates could show improvement, including:

- properties of materials, specifically wood and plastics;
- brazing mild steel;
- techniques associated when working with acrylic plastic;
- industrial practices, including injection moulding and other manufacturing processes used in volume production, CAD-CAM and quality control;
- overall quality of communication in terms of clarity of sketches and the accuracy of technical detail in written notes.

Comments on specific questions

1 The majority of candidates achieved their highest marks for this question.

(a) Dowel was correctly named by the majority of candidates.

(b) There were a wide variety of correct answers available to candidates naming the tools used to make the hull of the toy boat. Saw, drill and glasspaper were named by the majority of candidates.

(c) The majority of candidates were able to draw a template that could have been used to mark out the shape of the hull and marked the position of the hole for the mast.

(d) The most common correct answers referred to the need for no sharp edges or safe and simple to use. Many candidates gave no small parts as one reason. There were small parts on the boat and candidates needed to justify this by stating that the parts could not be removed easily.

(e) Most sketches showed some form of screw, pin or nut and bolt to attach the rudder to the hull. To achieve a second mark provision was needed to allow the rudder to move from side to side. The best answers used a washer or noted that the screw or nut and bolt would not be fully tightened to allow movement.

2

(a) Many candidates showed good understanding of the basic research that would need to be carried out before designing the cycle stand. Most answers related to the dimensions and types of cycle. Some candidates thought it essential to consider the most appropriate parts of the cycle where it could be supported. This was an excellent answer.

(b) Candidates knowledge and understanding of the brazing process was very poor. The question asked candidates to state the purpose of three basic items used when brazing. Few candidates answered all three parts correctly.

(c) Most candidates were able to provide a safety precaution when brazing; the majority of answers relating to the obvious dangers of the heat required to braze.

(d) Candidates would have been awarded a mark for “paint” as a suitable metal finish. However, many named “varnish” or “polish” which were not appropriate.

(e) There were many good answers showing the stem of the cycle stand inside the upright tube with three holes to allow for adjustment. Many candidates showed a pin to lock the stem but needed to show that the fitting was actually locked by means of a nut and bolt or screw thread. There were numerous clever devices shown that incorporated the use of spring-loaded pins that would give both the necessary adjustment and lock the stem safely.

3

(a) Candidates’ knowledge and understanding of basic tools used to mark out, cut and finish acrylic was unconvincing. The majority of candidates named a felt or permanent marker to mark out but many “pencils” were evident. “Pencil” can be correct if the backing paper is attached to the acrylic sheet but this needed to be explained for one mark.

Many candidates named a coping saw or band saw to cut out the shape.

File was the most appropriate tool used to smooth the edges with wet and dry paper not very common. There were many incorrect answers referring to the use of “sandpaper”.

(b) For maximum three marks the drilling jig needed to retain the acrylic securely on three sides. There were numerous potentially good designs but the acrylic could have moved out of position. Most candidates achieved one mark for the location of the hole.

(c) The most disappointing feature of the vast majority of candidates’ answers was the lack of knowledge and understanding of basic techniques and constructions when working with acrylic plastic. Very often sketches showed some kind of support without any information about the material it was made from or how it could be secured appropriately. It is important that candidates try to produce designs that are practical: for example, it is not feasible to nail into 5mm thick acrylic sheet.

4

(a) The most common mechanism shown was a spring. There were some elastic or rubber bands and the use of weights. Many candidates who sketched a spring or springs positioned them correctly although details of how they were fitted were not always clear. The best answers showed how each arm could be made to move back independently of the other and the use of dowel pegs or small screws to which the springs could be fastened.

(b) Generally, candidates understanding of on-screen modelling was very poor. Many candidates achieved one mark for a reference to CAD, simulation or a virtual design but very few were able to explain how the testing could be done.

(c) It was disappointing to read so many incorrect reasons for injection moulding being an expensive process. The best answers referred to the high initial costs associated with

tooling and making the moulds. This industrial process is used to manufacture so many different products in everyday use that candidates should have been able to give more accurate answers.

(d) The most common correct answers referred to checking to see if there were any sharp edges, whether the mechanism worked and a check on its size. Some candidates confused quality control checks with tests that could be carried out as part of a final product evaluation.

(e) This question was closely linked to candidates' coursework experience. The best answers related the clothes hook to adults or parents, possibly in nurseries or at home, purchasing the product for children. The majority of candidates achieved one mark for reference to the latter.

5

(a) Many candidates failed to read the question carefully and ignored the word "**before**" when applying a finish before assembly. Subsequently the answers concentrated simply on why a finish would be applied. Many candidates did state that it would be easier to apply the finish or that all the parts would be covered.

(b) The advantages of using manufactured boards rather than solid wood is a basic part of the area of the specification dealing with resistant materials yet only a minority of candidates were able to state that they are more stable, do not shrink, are more easily available or are cheaper than solid wood. It is important that candidates justify answers relating to cost, as many did not achieve marks for "cheap" or "cheaper" without the comparative comment.

(c) Candidates could have argued that either of the shelf designs was more expensive to manufacture in quantity than the other. The majority of answers simply related to the cost of the materials. Only a minority of candidates considered the actual manufacturing processes involved: for example that the wooden brackets would require more processes increasing production time and therefore labour costs.

(d) Many candidates stated advantages to the consumer and manufacturer for buying and producing self-assembly products respectively. The most common advantages included lower cost and ease of transportation for the consumer while reduced manufacturing costs due to no assembly for the manufacturer.

(e) There were few practical improvements to the designs shown. A simple lipping or edging to the wooden shelf or an added stretcher rail under the front of the shelf were good improvements while some candidates redesigned the bracket support for the manufactured board so that it was also fixed at the back of the shelf. Unfortunately, many of the 'improvements' were not practical or simply not improvements at all.

1956/02 Paper 02

General comments

There were opportunities for candidates to demonstrate their ability to provide solutions to design problems throughout the exam paper. Many candidates failed to achieve maximum marks due to a combination of poor communication skills and a lack of accurate annotated technical detail. There are areas of the specification where candidate performance could be improved, including:

- properties of materials, specifically wood;
- industrial practices, including injection moulding and other manufacturing processes used in volume production, CAD-CAM and quality control;
- an understanding of ergonomics;
- overall quality of communication in terms of clarity of sketches and the accuracy of technical detail in written notes.

Comments on specific questions

1

(a) The most common mechanism shown was a spring. There were some elastic or rubber bands and the use of weights. Many candidates who sketched a spring or springs positioned them correctly although details of how they were fitted were not always clear. The best answers showed how each arm could be made to move back independently of the other and the use of dowel pegs or small screws to which the springs could be fastened.

(b) Generally, candidates' understanding of on-screen modelling was very poor. Many candidates achieved one mark for a reference to CAD, simulation or a virtual design but very few were able to explain how the testing could be done. Some candidates named specific software that could be used and were rewarded appropriately.

(c) It was disappointing to read so many incorrect reasons for injection moulding being an expensive process. The best answers referred to the high initial costs associated with tooling and making the moulds. This industrial process is used to manufacture so many different products in everyday use that candidates should have been able to give more accurate answers.

(d) The most common correct answers referred to checking to see if there were any sharp edges, whether the mechanism worked and a check on its size. There were some excellent answers relating to random sampling to check the quality of surface finish. Some candidates confused quality control checks with tests that could be carried out as part of a final product evaluation.

(e) This question was closely linked to candidates' coursework experience. The best answers related the clothes hook to adults or parents, possibly in nurseries or at home,

purchasing the product for children. The majority of candidates achieved one mark for reference to the latter.

2

(a) Some candidates failed to read the question carefully and ignored the word "**before** when applying a finish before assembly. Subsequently the answers concentrated simply on why a finish would be applied. Many candidates did state that it would be easier to apply the finish or that all the parts would be covered.

(b) The advantages of using manufactured boards rather than solid wood is a basic part of the area of the specification dealing with resistant materials yet only a minority of candidates were able to state that they are more stable, do not shrink, are more easily available or are cheaper than solid wood. It is important that candidates justify answers relating to cost, as many did not achieve marks for "cheap" or "cheaper" without the comparative comment.

(c) Candidates could have argued that either of the shelf designs was more expensive to manufacture in quantity than the other. The majority of answers simply related to the cost of the materials. Only a minority of candidates considered the actual manufacturing processes involved: for example that the wooden brackets would require more processes increasing production time and therefore labour costs.

(d) Many candidates stated advantages to the consumer and manufacturer for buying and producing self-assembly products respectively. The most common advantages included lower cost and ease of transportation for the consumer with reduced manufacturing costs due to no assembly for the manufacturer.

(e) There were few practical improvements to the designs shown. A simple lipping or edging to the wooden shelf or an added stretcher rail under the front of the shelf were good improvements while some candidates redesigned the bracket support for the manufactured board so that it was also fixed at the back of the shelf. Unfortunately, many of the 'improvements' were not practical or simply not improvements at all.

3

(a) Many candidates gave the correct terms: reciprocating and rotary.

(b) There were numerous excellent mechanical systems shown that could provide the two forms of movement required. Many candidates could only provide the reciprocating movement using a cam or crank and received some credit, while some candidates showed a good understanding of off-centre cams and followers to provide both reciprocating and rotary movement.

(c) The best reasons for the mechanical toy not being sold commercially related to its limited appeal, very basic design or that it was too bulky.

(d) This question was linked to the candidates' experience of coursework and specifically the type of questions that a child could be asked when evaluating a product made for that child. Many candidates achieved marks for sensible questions including: "did you enjoy playing with the toy?", "was the handle easy to turn?", or "what did you like most about the toy?"

4

(a) There were many excellent answers showing how the glass shelf could be made to adjust. The best designs showed additional strips fixed to the inside of the cabinet or the use of pre-manufactured components and holes drilled into the sides. In many cases it was the attention to detail that secured the third mark for candidates' answers: for example details about the section, material and size of the strips or the exact measurement for the position of the holes.

(b)(i) Only a minority of candidates achieved full marks for this question. Marks were awarded for sketches showing two runners at the bottom and top of the cabinet and then marks for explaining the provision that would need to be made for fitting the mirror doors. Many candidates only showed one groove or applied runners and very few realised that the gap inside the top of the cabinet would need to be greater than the gap at the bottom so that the doors could be inserted.

(ii) Many candidates gave the main advantage of sliding doors as space saving.

(c) The most appropriate stage at which the doors would be checked to see if they fit and slide would have been prior to gluing up, when the grooves have been cut or runners applied during dry assembly. Many candidates left the check until the cabinet was glued together.

(d) Candidates must realise that answers such as "varnish" or "paint" are not acceptable at this stage in the exam paper. The important factor was recognised by many candidates that a bathroom cabinet would be subjected to humid conditions and would therefore require a waterproof finish.

5

(a) Most candidates correctly named polystyrene or acrylic as the vacuum formed material.

(b) It was disappointing that many candidates were unable to provide two design features of the mould used to vacuum form. There were some correct answers relating to draft angle, rounded corners/edges and air holes.

(c) The best answers referred to the need for a grip on the handle or that it was an appropriate size or the switch that would be easy to flick on or off. There were few references to the flashing light. Unfortunately, some candidates made vague references to the handle and switch without actually describe the ergonomic features.

(d) This part of the question tested the candidates' ability to redesign the product to incorporate a base. Many designs lacked clarity in terms of quality of sketching or the technical detail required to transform an idea into a practical solution. Often, answers showed potentially good designs without any supporting practical details. There were some superb designs, many of them utilising the flexible nature of some thermoplastics, to include 'clips' and slots into which the base could fit. Other excellent designs used a solid base made from MDF and the use of screws to fix it in position.

1956/03 Paper 03

General Comments

The vast majority of candidates attempted all of the questions and were able to gain marks throughout the paper. There was clear evidence of very good time management by most candidates.

There are areas of the specification where candidates could show improvement, including:
- knowledge of correct technical terminology for tools and processes;
- knowledge of basic joining methods of similar and dissimilar materials;
- knowledge of basic properties of commonly used resistant materials;
- knowledge and understanding of the use and value of jigs and formers;
- knowledge and understanding of 'commercial production methods' and
- improved communication skills including basic 2D and 3D sketching.

Comments on Individual Questions

1

(a) (i) Well answered with the most popular answers being housing joints and dowelling joints. A butt joint was the most popular incorrect answer.

(ii) Generally well answered with the majority of candidates correctly identifying their suggested joint from part (a) (i). Candidates were rewarded for a correct joint even if part (i) was incorrect.

(b) A very good range of appropriate reasons were given. Many identified protection and improved aesthetics which were the two most popular answers.

(c) Generally well answered with a wide range of correct responses seen for point 3.

(d) 3 marks were available for this question with one mark available for a suitable method, and up to two marks for the details shown of the suggested method. Almost all candidates gained a mark for the method with a high proportion gaining a second mark for giving sufficient appropriate details. A significant number of candidates gained the third mark for additional details of their chosen method the question then proving to be a very good discriminator. The poor quality sketching capability hampered a number of candidates.

2

(a) This was well answered but with a significant number of candidates suggesting a marking gauge for the marking out, stage 1, and also various inappropriate saws suggested for the third stage. The most popular correct answers were pencil, try square for stage 2, vice and G clamp for stage 2, tenon saw for stage 3.

(b) A wide range of suggestions were made for the size of the hole with a significant number of candidates clearly understanding the situation.

(c) A significant number of candidates understood the principles of holding the keys securely but loosely in place by various means. More able candidates suggested tapered pins or star washers however a large number of candidates simply suggested gluing them in place reflecting a lack of understanding of the concept in question.

(d) A range of responses was seen but once again the lack of graphical skills hampered many candidates. A full range of marks were awarded for this part of the question with candidates who used the bullet points to guide their thinking clearly scoring higher.

3

(a) Most candidates gained one of the two available marks for this question. A significant number of candidates correctly identified the physical properties of acrylic with a lesser number identifying the working properties.

Pleasingly many candidates gained the full two marks for this part of the question clearly understanding the concept of the development. A smaller number failed to grasp the situation but were able to move on and gain marks later in the question.

(b) Sawing out the waste material using a coping saw, heating prior to bending followed by filing and sanding it smooth or polishing the sawn edges were the most popular answers to this part of the question. More able candidates showed clear understanding by reflecting on drilling a hole and feeding the blade through and then suggesting a former to bend the acrylic around which was pleasing to see.

(c) A wide range of responses were seen in response to this part of the question. The full range of marks was awarded with two marks available for the idea and a further mark for some technical detail however only the more able gained the full three marks. Many candidates seemed content to provide the minimum amount of information which was unhelpful and thus restricted the award of marks.

4

This question is about Industrial Practices, CAD/CAM and the effects of D&T in Society.

(a) The majority of candidates identified the second point which was the correct answer.

(b) Most candidates gained at least one mark for this part of the question but with the more astute gaining easy marks by extracting information from the table in part (a). There were some very mature specification points made by a number of candidates and an equal number of poor responses such as “must be cheap” or “durable”. Without clarification these types of responses will fail to gain a mark.

(c) The value of making a prototype was clearly understood by many candidates. However the lack of technical terminology was also clearly evident. Most candidates gained at least one mark with a pleasing number suggesting “showing the client”.

(d) This part of the question was very poorly answered. Centres are reminded that candidates should have knowledge and understanding of 5.2.5 Health and Safety and also 5.1.9. Industrial Applications of the specification and should expect questions related to these aspects.

With the exception of a minority of candidates the risk assessment was understood by candidates to relate to toys rather than the manufacture of toys. Candidates were not doubly penalised but needed to give a comprehensive response to gain the full two marks if they responded in this way. The majority of candidates gained one mark for valid reasoning despite their misunderstanding of the thrust of the question.

(e) This part of the question was answered well by the majority of candidates. Repeated accuracy and improved production times were the most common correct answers.

(f) This part of the question was poorly answered with many candidates failing to "describe a test". A significant number of candidates suggested types of testing but did not answer the question. The most popular correct answer was to give the toy to a child and observe and record the outcomes.

5

This is the Themed question with pre-release materials being sent to Centres prior to the examination.
It is very pleasing to note that there was very clear evidence that Centres had undertaken quality product analysis activities in relation to this pre-release material. A significant improvement in the award of marks over all previous sittings was noted.

(a) Generally well answered with most candidates correctly identifying Aluminium.

(b) This was also generally well answered with candidates' own experience of the material evident. Where candidates stated that it was "light" they failed to gain a mark. However a large number of candidates correctly stated it was lightweight and many gave much fuller correct responses.

(c) User groups were correctly identified by the majority of candidates with a significant number gaining two marks for this part of the question. Some very astute observations were made by a good number of candidates who did not restrict themselves to the most obvious "litter Picking" activities.

(d) Very well answered by a large number of candidates. A smaller number failed to gain a mark for stating the device would be easy to carry or store. The suggestion that it would be easier to carry or store gained marks for a high percentage of candidates. The most common incorrect answer was to pick things up in difficult places.

(e) The understanding of the benefits and functions of a roll pin was understood in general terms by a good number of candidates but in-depth understanding was rarely evident.

(f) Shortening the cord would have the desired effect but the large number of candidates who suggested this method did not truly understand the mechanical advantage problem which had been set. Nevertheless they gained one of the three marks available.
Where candidates had had the benefit of good product analysis understanding was shown with reference to the relocation of the cord on the claw closer to the fulcrum.
A smaller number of candidates suggested changes and additions to the spring which did not bring about the desired effect.

1956/04 Paper 04

General Comments

The vast majority of candidates attempted all of the questions and were able to gain marks throughout the paper. There was clear evidence of very good time management by most candidates.

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

- knowledge of correct technical terminology for tools and processes;
- knowledge of basic joining methods of similar and dissimilar materials;
- knowledge of basic properties of commonly used resistant materials;
- knowledge and understanding of the use and value of jigs and formers;
- knowledge and understanding of 'commercial production methods' and
- improved communication skills including basic 2D and 3D sketching.

Comments on Individual Questions

1

This question is about Industrial Practices, CAD/CAM and the effects of D&T in Society.

(a) The majority of candidates identified the second point which was the correct answer.

(b) Most candidates gained at least one mark for this part of the question but with the more astute gaining easy marks by extracting information from the table in part (a). There were some very mature specification points made by a number of candidates and an equal number of poor responses such as "must be cheap" or "durable". Without clarification these types of responses will fail to gain a mark.

(c) The value of making a prototype was clearly understood by many candidates. However the lack of technical terminology was also clearly evident. Most candidates gained at least one mark with a pleasing number suggesting "showing the client".

(d) This part of the question was very poorly answered. Centres are reminded that candidate should have knowledge and understanding of 5.2.5 Health and Safety and also 5.1.9. Industrial Applications of the specification and can expect questions related to these aspects.

With the exception of a minority of candidates the risk assessment was understood by candidates to relate to toys rather than the manufacture of toys. Candidates were not double penalised but needed to give a comprehensive response to gain the full two marks if they responded in this way. The majority of candidates gained one mark for valid reasoning despite their misunderstanding of thrust of the question.

(e) This part of the question was answered well by the majority of candidates. Repeated accuracy and improved production times were the most common correct answers.

(f) This part of the question was poorly answered with many candidates failing to "describe a test". A significant number of candidates suggested types of testing but did not answer the question. The most popular correct answer was to give the toy to a child and observe and record the outcomes.

2 This is the Themed question with pre-release materials being sent to centres prior to the examination.
It is very pleasing to note that there was very clear evidence that centres had undertaken quality product analysis activities in relation to this pre-release material.
A significant improvement in the award of marks over all previous sittings was noted.

(g) Generally well answered with most candidates correctly identifying Aluminium.

(h) Again generally well answered with candidates' own experience of the material evident. Where candidates stated that it was "light" they failed to gain a mark. However a large number of candidates correctly stated it was lightweight and many gave much fuller correct responses.

(i) User groups were correctly identified by the majority of candidates with a significant number gaining two marks for this part of the question. Some very astute observations were made by a good number of candidates who did not restrict themselves to the most obvious "litter picking" activities.

(j) Very well answered by a large number of candidates. A smaller number failed to gain a mark for stating the device would be easy to carry or store. The suggestion that it would be easier to carry or store gained marks for a high percentage of candidates. The most common incorrect answer was to pick thing up in difficult places.

(k) The understanding of the benefits and functions of a roll pin was understood in general terms by a good number of candidates but in-depth understanding was rarely evident.

(l) Shortening the cord would have the desired effect but the large number of candidates who suggested this method did not truly understand the mechanical advantage problem which had been set. Nevertheless they gained one of the three marks available.

Where candidates had had the benefit of good product analysis understanding was shown with reference to the relocation of the cord on the claw closer to the fulcrum.
A smaller number of candidates suggested changes and additions to the spring which did not bring about the desired effect.

3
(a) A significant number of candidates identified galvanising and either plastic or powder coating as suitable surface finish which were the three most popular answers. The most popular incorrect answer was "paint" reflecting that the question had not been read correctly.
(b) The knowledge of the properties of exterior grade plywood was generally scarce but with a good number of excellent responses noted. Most candidates gained at least one mark in this part of the question for suggesting "water resistance" more by association that actual understanding.

(c) This part of the question was well answered with a good range of suggestions made clearly reflecting understanding of the term "ergonomic". Shaping to accommodate the contours of the body was the most popular answer.

(d) More able candidates gained two marks for this part of the question with relative ease. The suggestion of flexible plastic sleeving, many responses with good justifications, was the most common response.
The most popular incorrect answer was to make the links of the chain smaller.

(e) Two marks were available for a suitable method and two marks for protection of the plywood seat. Where candidates followed the guidance of the bullet points they gained 3 or 4

marks with relative ease. Some very good thinking was evidenced and where candidates had good graphical capability it enabled more detailed responses to be given.
A significant number of candidates suggested very good methods of secure fixing but failed to consider the second bullet point.

4

(a) Surprisingly not all candidates identified Injection Moulding which was the correct answer. A minority suggested vacuum forming but most candidates gained a mark for this part of the question.

(b) In general there was good understanding shown of quality control checks but responses varied Centre by Centre. Most common correct answers reflected on maintained quality of product and customer satisfaction, safety and company image.

(c) The most common correct answer was checking the sizes of the shelf pegs. A significant number of candidates gained a mark for this part of the question.

(d) A good range of responses were seen and where candidates used the bullet points as guidance they scored well. Some very interesting solutions were noted.

(e) Most candidates clearly understood the problem and suggested plastic or metal inserts to protect the upright. A few candidates redesigned the upright or suggested using a different material. Neither of these options was able to be rewarded.

5

(a) A disappointing response once again to this type of question. The flexibility for candidates to choose a production method with which they are familiar is deliberate but failed to get appropriate responses.
A small number of candidates gained the full 5 marks with a very much larger number gaining just one mark for suggesting a suitable finish to the funnel. Where candidates suggested injection moulding they were still able to gain the full range of marks. Centres are asked to reflect on the structure of this style of question and guide candidates towards the full use of the bullet points.

(b) The full range of marks were awarded for this part of the question but a significant number of candidates failing to heed the restriction within the question reference the pre-manufactured components.
It is noted that many candidates' responses were very limited in volume and detail suggesting they were content to "just answer the question"

Coursework 1056/03 and 1956/05

The moderation process in GCSE Resistant Materials demonstrated that the vast majority of Centres have a good understanding of the specification and interpretation of the six assessment objectives for the coursework component. In larger Centres, the process of moderation always runs smoother when teaching staff invest time in planning and assessing the candidates work together, rather than in isolated groups. The procedure ensures that the rank order of candidates is correct and the moderator can scale the marks up or down, if necessary, without fear of some candidates being allocated the wrong mark.

A minority of teaching staff need to be reminded that coursework is an examination component and candidates must be given the opportunity to demonstrate their own ability and problem solving abilities through the designing and making process. Some Centres have adopted a very descriptive approach to the coursework where all candidates are being told exactly what to do on each portfolio sheet and how to do it. This practice is fine for lower achieving candidates who need support and benefit from writing frames and prompt sheets, but should be discouraged for the more able students. A coursework support booklet is adopted in many Centres. This provides students with a helpful guide through the objectives without dominating the outcome. Candidates are free to present the work in any appropriate manner, although, on this specification, it is not permitted to present work stored on a computer disc. Moderators need access to a printed portfolio during the Centre visit along side the practical outcome. Candidates may work on A3 or A4 paper. It can be handwritten or computer generated. It is very encouraging to see that elaborate border designs are disappearing and candidates are no longer wasting time double and treble mounting their work on every design sheet. The use of ICT is being extending as more candidates are gaining access to CAD software programmes. It is a requirement of the specification that candidates use a wide range of graphical techniques with includes the opportunity to design or model their proposed solutions or final outcome, using computer generated images.
CAM is to be encouraged where facilities are available. Centres need to be reminded that candidates are to combine a *range of skills* and techniques when constructing their final outcome.

To ensure success in this examination, the selection of the product for construction is very important. Far too often, able candidates make products that do not demonstrate their problem solving abilities or construction skills and the less able are permitted to embark on projects that are far too complex for their ability. Technicians and teaching staff are there to support the candidates only. Staff or parents are not permitted to ‘construct’ or apply a finish to candidates’ work. Evidence of malpractice will be investigated by OCR.

The key element of the coursework component is that candidates write a design brief for a marketable product. They need to identify the potential user group and investigate the consumer expectations and needs for that type of product. During the designing and making process candidates need to consider the possibilities for manufacturing in small batches. They need to design and make a simple control device in objective 4 such as a jig, template or former. They need to use the control device during objective 5 and evaluate its effectiveness in objective 6. Photographs are an excellent way of recording evidence although in many Centres the sample provided for moderation contained all the experimental work and control devices constructed and used by candidates.

Although wood still dominates the choice of construction materials, candidates are making plastic and metal products.

Objective 1 – Many candidates covered this objective well, using one sheet of A3 paper. High achieving candidates focused straight away on what they wished to design and make, who they

were designing for, (the consumer or user group) and the situation in which the product would be used.

Objective 2 – This objective was usually covered well by the candidates. The evaluation of similar products, showed far more personal opinions about the suitability of the product they were analysing in terms of function, materials, suitability, retail price etc. It is more beneficial to analyse two products in detail rather than a large number with superficial comments.
Candidates tended to seek opinions of others through a questionnaire but this approach often lacked useful analysis. The questions often tended to be superficial and difficult to process. It might be of greater benefit to ask one person who has a wide experience of the type of product rather than 6 members of their own peer group. There was very little evidence of candidates using the results of the questionnaire to inform the specification.
Many candidates failed to address the requirement to provide relevant data. It is important that they gather, comment on, and use important research. For example, if the student is designing a mechanical money box, then they need to know the size, shape and thickness of the coins - the different mechanisms that provide different outcomes and different ways of retrieving the money when required. All of these factors will be needed when the candidates start designing their products in objective 3.
The design specifications varied greatly. Many did not make reference to the fact that they needed to consider the possibilities of quality control during batch production.
It is encouraging to note that many Centres have now avoided adding general notes about materials and construction processes. This information is better placed in objective 4 after students have designed their product.

Objective 3 – It was disappointing that many Centres did not spend longer on developing ideas and fully engage in the problem solving process. Far too often the designs were presented as a number of unconnected drawings of products, one of which is then chosen to be made. There is a greater increase in the use of CAD to both generate ideas and model final outcomes. Some candidates need to be reminded to justify their final choice of design against the specification written in objective 2.

Objective 4 – Many Centres still misunderstand the requirements of this objective. Having designed the product, the candidate now needs to work out which materials are most suitable and why – how many components make up the product, exact sizes and shapes, and how these components will be joined together. The testing of some of these possibilities needs to be carried out by the candidate and evaluated so that final decisions can be made. Modelling should be used as a means of visualising the design or trying out part of a manufacturing process. Candidates need to consider which control device they need to make so they can make use of it during the construction of the actual product and evaluate its success in objective 6. Any modifications made should be clearly identified.
Candidates need to provide any information about purchased components such as door handles, hinges, jewellery findings etc. A final costing sheet shows if the candidate has kept within their original budget.
More and more candidates are writing a manufacturing specification which helps them focus through the next stages.

Objective 5 – There seemed to be a wide difference between Centres in the type of planning needed in objective 5. Candidates are awarded up to 12 marks for planning the sequence of making. The usual approaches include a basic flow diagram or a time chart which also showed identified process, the necessary tools and equipment, risk assessment etc. With a complex product, the better candidates sub-divided the process and planned a week or two in advance, rather than trying to estimate the entire making process at the beginning. This is a good approach enabling candidates to set realistic and achievable targets. Between 0 - 3 marks can be awarded if there is no written evidence of construction planning. 3 marks are awarded when the outcome is described as ’high quality’, 2 marks for a ‘good’ outcome, 1 mark for a ‘reasonable’ outcome and no marks for a ‘low standard’ outcome.

During construction, candidates need to focus on producing a quality product that functions as intended. Marks are awarded for their ability to use tools and equipment correctly and for working independently. The new CSF assessment sheets completed by Centres clearly show how the 52 marks are sub divided.

Objective 6 – Unfortunately many candidates seemed to run out of time and the evaluations were often done quickly without real understanding or full justification. Success in this objective relies upon candidates having produced a good initial specification. It is important that candidates test their product to make sure it does what was specified at the beginning of the project. If teachers are reluctant to let pupils take their exam work home to test the product in the situation it was designed for, then school 'bench top testing' or simulation is acceptable. As a result of this testing, candidates should be encouraged to suggest modifications to the product. The control device used during the construction of the product needs to be evaluated.

Presentation marks - These marks are available for the presentation of the candidates' coursework. This includes the candidates' ability to progress through the stages of designing and making in a logical way. The work should be easy to understand and the information easy to access. In most Centres these marks were awarded appropriately.

General Certificate of Secondary Education
Design & Technology: Resistant Materials (Short Course) 1056
June 2006 Assessment Series

Component Threshold Marks

Component	Max Mark	A	B	C	D	E	F	G
01 Paper 1	50			27	23	19	16	13
02 Paper 2	50	28	23	19	14			
03 Coursework	105	79	67	55	44	34	24	14

Syllabus Options

Foundation Tier

	Max Mark	A*	A	B	C	D	E	F	G
Overall Threshold Marks	175				86	72	59	46	33
Percentage in Grade					22.1	25.6	13.8	12.3	14.8
Cumulative Percentage in Grade					22.1	47.7	61.6	73.9	88.7

The total entry for the examination was 285

Higher Tier

	Max Mark	A*	A	B	C	D	E	F	G
Overall Threshold Marks	175	132	115	98	82	64	55		
Percentage in Grade		7.3	20.3	26.3	25.0	17.2	3.0		
Cumulative Percentage in Grade		7.3	27.6	53.9	78.9	96.1	99.1		

The total entry for the examination was 270

Overall

	A*	A	B	C	D	E	F	G
Percentage in Grade	3.9	10.8	14.0	23.7	21.1	8.0	5.75	6.9
Cumulative Percentage in Grade	3.9	14.7	28.7	52.4	73.6	81.6	87.3	94.2

The total entry for the examination was 555

General Certificate of Secondary Education
Design & Technology: Resistant Materials (Full Course) 1956
June 2006 Assessment Series

Component Threshold Marks

Component	Max Mark	A	B	C	D	E	F	G
01 Paper 1	50			27	23	19	16	13
02 Paper 2	50	28	23	19	14			
03 Paper 3	50			34	29	25	21	17
04 Paper 4	50	35	30	26	21			
05 Coursework	105	79	67	55	44	34	24	14

Syllabus Options

Foundation Tier

	Max Mark	A*	A	B	C	D	E	F	G
Overall Threshold Marks	175				95	80	65	50	35
Percentage in Grade					28.4	24.2	21.2	14.0	7.3
Cumulative Percentage in Grade					28.4	52.7	73.8	87.8	95.1

The total entry for the examination was 14457

Higher Tier

	Max Mark	A*	A	B	C	D	E	F	G
Overall Threshold Marks	175	137	120	103	87	69	60		
Percentage in Grade		10.5	23.5	31.7	21.6	9.3	1.6		
Cumulative Percentage in Grade		10.5	33.9	65.7	87.3	96.6	98.2		

The total entry for the examination was 13209

Overall

	A*	A	B	C	D	E	F	G
Percentage in Grade	5.0	11.3	15.2	25.1	17.1	11.8	7.3	3.8
Cumulative Percentage in Grade	5.0	16.3	31.5	56.6	73.7	85.5	92.8	96.6

The total entry for the examination was 27666

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