OCR
RECOGNISING ACHIEVEMENT

GCSE

Design & Technology (Industrial Technology)

General Certificate of Secondary Education **GCSE 1959**

Report on the Components

June 2008

1959/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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Introduction to the Written Papers.

Responses to questions indicated that some Centres had addressed issues raised in previous reports, for example knowledge and understanding of industrial practice. It continues to be a matter of concern, however, that candidates' responses to technical questions requiring a basic knowledge of workshop practice and processes are generally quite poor.

It was again apparent that questions had not always been read correctly by candidates, this being the case in both Foundation and Higher Tier papers. The importance of examination technique cannot be over emphasised and this includes the careful reading of each question prior to answering. It should be noted that adequate time is allowed for candidates to fully complete all questions on the papers, including ample opportunity for them to familiarise themselves with the content before beginning their responses.

This year it has been possible for examiners to magnify a candidate's work during marking, but despite this a significant number of scripts were difficult for examiners to read because of poorly written responses. Whilst correct spelling is not a particular issue, it is obvious that candidates' responses must be clear to an examiner in order for marks to be awarded.

Responses to questions requiring the use of annotated sketches were disappointing this year and many sketches lacked both detail and quality of communication.

1959/01 Paper 1 (Foundation)

Comments on Individual Questions

1 **(a)** A mixed response to this question indicating that in some Centres candidates are familiar with the centre lathe whilst in others candidates have had little experience of the equipment.

(b) Responses followed a similar pattern as in part (a). Some candidates confused the revolving centre with a Jacobs chuck.

2 **(a)** Most candidates were able to extract the relevant information from the drawing. There was evidence of some careless mistakes particularly in identifying the correct number of anchor plates. A number of candidates invented a material for the steps.

(b) **(i)** Some candidates missed the opportunity of a mark because they did not identify the correct steel.

(ii) Most answers correctly made reference to the corrosion resistance of stainless steel. Candidates relating their answers to strength needed to clarify the statement to gain a mark.

(c) Candidates offered a range of interpretations and many did not think carefully about the sizes indicated at B and C. The answer demands a clear technical interpretation, and size is not sufficient information.

3 **(a)** Most candidates picked up marks through a wide range of answers either focusing on a single process or including a wide range of operations. Marks were awarded for using technical terminology to correctly identify processes, operations or tools.

(b) Most candidates understood the principle of a jig. The responses presented were varied and the best answers were where candidates produced quality sketches. Some candidates indicated little understanding of appropriate materials.

(c) **(i)** **(ii)** A poorly answered question indicating limited knowledge of standard components and fittings.

4 **(a)** Some candidates lost marks because their answers referred to the manufacturer rather than the user. If candidates make reference to cost or strength they must clarify their answer.

(b) The number of correct answers to this question indicated that candidates are now more aware of injection moulding as a process.

(c) Although candidates are aware of the process of injection moulding, their technical understanding of mould design is generally weak. The concept of limiting the weight of the product whilst maintaining rigidity through the careful positioning of webs is little understood.

(d) Answers indicate that candidates are aware of a number of processes but are unable to apply the correct process to a given situation.

(e) There is little evidence of Centres using casting as a process in coursework projects and the poor responses to this question support these findings. Those candidates that had experience of casting showed this clearly in their answers.

5 **(a)** The majority of candidates picked up marks in this section. A few candidates carelessly repeated their answer, and reference to the words ‘strong’ and ‘cheap’ without clarification failed to score marks.

(b) Most candidates were able to pick up marks in this section and showed their awareness of the advantages of computer systems.

(c) Many good attempts at this question. Those candidates that secured maximum marks produced clear sketches and followed the bullet points in the question using appropriate technical terminology. A number of answers referred to a spring loaded pin but failed to ensure the mechanism was locked safely and therefore dropped a mark.

1959/02 Paper 2 (Higher)

Comments on Individual Questions

1 **(a)** Some candidates lost marks because their answers referred to the manufacturer rather than the user. If candidates make reference to cost or strength they must clarify their answer.

(b) The number of correct answers to this question indicate that candidates are now more aware of injection moulding as a process.

(c) Although candidates are aware of the process of injection moulding, their technical understanding of mould design is generally weak. The concept of limiting the weight of the product whilst maintaining rigidity through the careful positioning of webs is little understood.

(d) Answers indicate that candidates are aware of a number of processes but are unable to apply the correct process to a given situation.

(e) There is little evidence of Centres using casting as a process in coursework projects and the poor responses to this question support these findings. Those candidates that had experience of casting showed this clearly in their answers.

2 **(a)** The majority of candidates picked up marks in this section. A few candidates carelessly repeated their answer and reference to the words ‘strong’ and ‘cheap’ without clarification failed to score marks.

(b) Most candidates were able to pick up marks in this section and showed their awareness of the advantages of computer systems.

(c) Many good attempts at this question. Those candidates that secured maximum marks produced clear sketches and followed the bullet points in the question using appropriate technical terminology. A number of answers referred to a spring loaded pin but failed to ensure the mechanism was locked safely and therefore dropped a mark.

3 **(a)** A significant number of candidates correctly identified the extrusion process.

(b) Answers indicated that more Centres now look at plastics materials and their properties and uses during the course.

(c) Answers to this question were disappointing with the majority of candidates wrongly focusing on the operation of the injection moulding machine rather than the key features of the mould for the process to be successful.

(d) There were some interesting solutions. Again those candidates that addressed the bullet points in the question were awarded marks. There was a variety of clamping systems, some of which would be difficult to install but allowed adjustment and did not depend on drilling into the roof beams. The quality of sketching again had a significant influence on the marks scored.

4 **(a)** **(i)** Many correct answers to this part of the question were seen.

(ii) Many candidates correctly understood the efficiency of the system, although some found difficulty in explaining their answer. Few scored both marks by showing understanding of the change in direction or the braking effect of the mechanism.

(b) A poorly answered question. Many answers wrongly referred to friction grips. Those candidates that included a sleeve system in their answers often failed to indicate how a sleeve could be retained in place.

(c) **(i)** Very few candidates were able to correctly answer this part of the question.

(ii) Candidates that made reference to 'tolerance' in their response gained both marks, but explanations were generally weak.

5 **(a)** Most candidates were able to correctly define the term 'alloy'.

(b) Many candidates indicated a clear understanding of the reasons why metals are alloyed. A significant number made reference to effects on conductivity, change in melting point and strength to weight ratios.

(c) A disappointing number of correct answers. Some candidates wrongly made reference to mould numbers or batch numbers.

(d) This question differentiated candidates understanding of commercial practice and was answered well by only the more able candidates.

(e) A significant number of candidates were unable to interpret the information given on the graph in order to answer this question correctly.

(f) This question identified those candidates that understood production methods. Many candidates wrongly made reference to batch size as affecting fixed costs.

1959/03 Paper 3 (Foundation)

Comments on Individual Questions

1 **(a)** Disappointingly few candidates scored high marks on this question, with the majority recognising only the most basic marking-out tools - rule, scriber and try square. Very few candidates were aware of the scribing block / surface gauge and the average mark for this part of the question was a rather weak 3.

(b) This part of the question was generally well answered, with most correct responses referring to preventing the drill skidding on the surface of the metal. In a number of cases, however, the candidate's response was not clearly expressed, and 'benefit of the doubt' was applied.

(c) Most candidates suggested the use of marking blue / layout fluid or broad felt markers to coat the surface of the metal before using the scriber. Few candidates gained full marks, with some optimistically suggesting that "pressing on harder" might suffice.

(d) Only a limited number of candidates answered this part correctly by naming a template. The most commonly given incorrect response was "jig", whilst many candidates gave no response at all.

2 **(a)** Few candidates scored well on this question and knowledge of lathe tools and processes appeared very limited. This was most disappointing, particularly as most candidates' coursework would have involved using the lathe for at least part of the practical outcome.

(b) This question was attempted by the majority of candidates, with suggestions for improvement ranging from increasing the head diameter of the screw to adding 'tommy bar' holes or even 'wings'. The quality of sketching was variable, but candidates were generally able to make their suggested improvement sufficiently clear.

(c) It was pleasing to see that virtually all candidates were able to gain full marks on this part of the question by giving two sensible and relevant safety precautions for using the lathe.

3 **(a)** Many candidates did not take into account the length of the mild steel rack, and the over simplistic approach of bending in a vice was only awarded one mark of the three available. A number of responses included heating this thin sheet metal to red hot and even bending it by hand. More acceptable responses included the use of folding bars or angle iron to support the metal along its length whilst bending using a mallet.

(b) Candidates' knowledge of these basic "pre-manufactured components" appeared to be rather limited, with few gaining more than a single mark. In too many cases the simple response "size" was given, without any qualification at all, and the thread itself was rarely mentioned.

(c) This part of the question was generally well answered. Few candidates gained full marks, however, as the over simplistic response of "making the holes bigger" to allow files to be removed more easily was only awarded one of the two marks available.

4 **(a)** Very few candidates gained full marks on this part of the question and many confused CAD with CAM, giving responses that related to manufacturing rather than design. This is a good example of candidates' failure to read questions carefully before answering, thereby losing marks on quite basic questions. The most common correct responses included the ability to send designs electronically and the ease of making changes. Too many candidates simply used the words "quick" and "easy" without qualifying them in any way.

(b) This part of the question was generally well answered. Most candidates were able to identify three means of storing designs electronically, although in a number of cases responses such as "on the Internet" were too vague to gain a mark without further detail being given.

(c) Few candidates gained more than one mark here and in a number of cases there was some confusion between CAM and CAD.

(d) A significant number of candidates failed to grasp the importance of the word "control" in relation to production and gave responses that simply related to CAD or CAM, often repeating responses given to earlier parts of the question. Correct responses referring to stock control, quality control and robotics were quite rare, although a mark was awarded for reference to the control of machinery.

5 **(a)** Very few candidates gave the correct response of Die Casting in this part of the question. The frequency with which "Injection Moulding" appeared was further indication of candidates' failure to read the questions carefully before answering.

(b) Most candidates were able to give at least one correct advantage of using the cordless drill, but simplistic and incorrect responses such as "cheaper" and "lighter" were common.

(c) It was apparent from responses given that the majority of candidates had little understanding of ergonomic principles or how they are applied, although some candidates did gain one mark by identifying the grip and comfort of the handle.

(d) This part of the question was well answered by many candidates. Some showed quite clear understanding of environmental issues, although repetition of points meant that few candidates gained full marks.

1959/04 Paper 4 (Higher)

Comments on Individual Questions

1 **(a)** Some candidates gained full marks on this part of the question, but a significant number confused CAD with CAM, giving responses that related to manufacturing rather than design. This is a good example of candidates' failure to read questions carefully before answering, thereby losing marks on quite basic questions. The most common correct responses included the ability to send designs electronically, the ease of making changes, and the ability to view designs in 3D.

(b) This part of the question was generally well answered, with most candidates being able to identify three means of storing designs electronically. In some cases, however, responses such as "on the Internet" were given, which were too vague to gain a mark without further detail being given.

(c) The majority of candidates gained marks here, with reference to labour costs and consistency of products being included in most correct responses. In a few cases there was evidence of some confusion between CAM and CAD, preventing candidates from scoring well.

(d) There were some good responses given to this part of the question, with reference being made to stock control, quality control and robotics as examples of control using computer technology.

2 **(a)** Few candidates gave the correct response of Die Casting in this part of the question. The frequency with which "Injection Moulding" appeared was further indication of candidates' failure to read the questions carefully before answering.

(b) The majority of candidates were able to give advantages of using the cordless drill, most referring to the safety aspect of having no cable or mains electricity. Simplistic and incorrect responses such as "cheaper" and "lighter" were quite common, however, preventing many candidates from gaining full marks.

(c) A good proportion of candidates attempted this part of the question, although many responses did not show clear understanding of ergonomic principles or how they are applied. It was common for candidates to refer to the grip and comfort of the handle, but often there was no mention of how this relates to the hand of the user.

(d) This was generally well answered and in many cases quite detailed responses were given, with candidates demonstrating clear understanding of environmental issues.

3 **(a)** **(i)** Most candidates were able to suggest a suitable plastic for vacuum forming the tray, the preferred and most common responses being HIPS or ABS.

(ii) A considerable number of over simplistic one-word answers such as "quick" and "easy" were seen, these being totally inadequate at this level. Candidates were awarded marks for giving appropriate and qualified reasons, such as the ease of producing the shape required in plastic only 1mm thick.

(iii) This was generally well answered, with a good range of appropriate processes being given.

(b) The most frequently awarded mark for this part of the question was two out of the three available. Whilst the majority of responses referred to “draft angle”, few combined this with rounded corners or fillets to gain top marks.

(c) A number of candidates did not take into account the word “simple” in their suggested design changes and some interesting and quite complex solutions were put forward. The most common response consisted of simple indents for fingers, and many candidates gained full marks for presenting this appropriately.

4 **(a)** This was well done by many candidates, although some lost marks due to poorly presented responses. Some very good responses included full details of the assembly and fixing methods used.

(b) This part of the question was not well answered, with very few candidates showing awareness of either reaming or boring to produce smooth and accurately sized holes.

(c) A variety of workable solutions were seen in response to this design question, many of them being well communicated using clear annotated sketches. Whilst most candidates devised a suitable locking method, only a limited number adequately allowed for ease of rotation, resulting in a mark of three out of four being common.

5 **(a)** Most candidates referred simply to the quantities produced in batches and the speed of production. Few showed any real awareness of the reasons for using batch production, such as cost effectiveness, efficient use of machines, or the requirements of JIT.

(b) **(i)** Only a limited number of candidates were able to describe “Cell Production”, in many cases this being confused with “One-Off or Job” production.

(ii) In-line Assembly was better known to candidates and the majority gained marks on this part of the question.

(c) Few candidates understood the meaning of “logistics” and its relationship to the movement and supply of materials in manufacturing. Many candidates presented an answer that was based around the word “logical” and some made reference to the organisation of manufacturing, for which a mark was awarded.

1959/05 Coursework

General Comments

Work from candidates across the full range of abilities was seen by moderators this year and there were examples of some very well engineered devices from a number of Centres. The performance of the less able candidates was again restricted by an inability to complete the practical outcome and all too often in these cases only a handful of unfinished parts was presented for assessment in Objective 5.

In a number of Centres the coursework folios presented for assessment contained too much teacher directed work. This appeared in a number of forms, including very specifically worded handouts and work that had clearly been teacher generated in lessons and then repeated by all candidates in their individual folders. Objectives 2 and 3 were the areas where this was most apparent, but in some Centres it was also done for work presented in Objective 4. This approach is not in the spirit of the specification and Centres must ensure that work presented for assessment contains the independent work of the candidates, and that sources of any information given are properly acknowledged.

The use of writing frames, whilst not an issue and clearly beneficial to many candidates, needs to be carefully planned. The writing frames should guide candidates through the folder, but not offer specific responses to the strands of the various assessment objectives. Whilst the writing frame approach can be helpful, particularly for less able candidates, it can be somewhat restrictive for candidates of higher ability and often limits their potential for success.

The quantity production requirement continued to present problems for some candidates and was often ignored completely, resulting in a reduced performance across the objectives. The requirement is for the device to be capable of producing batches of its product with repeatable accuracy and this should be considered throughout the project, with evidence of the device's ability to meet the requirement presented in Objective 6 (Evaluation & Testing).

Centres wishing to devise a different capability task to those detailed in the Course Specification must submit a formal proposal to the Board for approval in order to ensure that work done by candidates in the project meets the requirements of the assessment criteria. The proposal should be submitted prior to commencement of the project and a copy of the approved proposal must be made available for the moderator at the time of the visit.

Comments on Specific Objectives

Objective 1 – 'Identification of a Need or Opportunity leading to a design Brief'

It is not sufficient for candidates to merely repeat the capability task information from the specification in this objective. For the maximum mark, the candidate is required to enlarge upon this information by clearly showing consideration of the users and the design needs of the device.

Most candidates scored well here, although in a number of cases the design brief did not take into account the quantity production requirement of the device. It is important that this aspect is considered from the very outset of the project as this will enable candidates to more fully address the requirements of the Assessment Criteria in the objectives that follow.

Objective 2 – 'Research into the Design Brief which results in a Specification'

This objective continues to differentiate well across the ability range, with only the higher achieving candidates carrying out any positive research into the design and use of the chosen device. A number of candidates continue to fill this objective with pages of theory notes on materials and processes that are of no real relevance at this stage of the project. Some of this information may be of more benefit to candidates in Objective 4, where it can often be used to help decide upon materials and construction methods for the final device. Questionnaires were widely used by candidates this year, but the information collected was very rarely of any relevance and results were often presented without analysis. All data collected should clearly relate to the design and use of the device, and be analysed in detail.

Where candidates use the Internet to collect information for research they should make reference to this and acknowledge the sources of information. It is important that they then show how they have analysed and made use of the information, as simply printing out pages from a website cannot be accepted as evidence of research. This is also the case where candidates have used teacher generated notes and handouts for part of their research.

Most candidates were able to identify existing products, in many cases these being examples that had been presented to them. It is important that candidates evaluate these products against the needs of the users, as merely describing their operation is of little or no benefit. The more able candidates used their analysis of these products to gain information about the principles involved in their design and use, enabling them to relate this information to the design needs of their chosen device.

The majority of candidates produced a specification at the end of this objective, but many failed to take account of the requirement for the device to be capable of quantity production. The importance of a detailed specification cannot be over-emphasised, as it should be a point of reference throughout the project and also be used to test and evaluate the finished device.

Objective 3 – 'Generation of Design Proposals'

Most candidates were able to present a range of initial ideas for their chosen device, but in a number of cases these were too "guided", with all candidates in a Centre presenting identical design ideas. There is a tendency for some candidates to supplement the ideas section by adding details of sizes, materials, construction techniques and standard components to their design sketches. This is not strictly necessary at this stage of the project but, if it is done, the information will also be required in Objective 4, where marks are specifically available for such details.

Evaluation of design ideas continues to be rather weak for all but the highest achieving candidates, and often annotations on design sketches merely describe the design, and make no comparison with the requirements of the specification. In many cases the only reference to the specification took the form of a tick box or a "mark out of 10", with no detail being given as to how or why a particular idea had been chosen.

It is important that design ideas are clearly communicated, and annotated pencil sketches remain the most appropriate and most widely used method of presenting initial ideas. The standard of sketching seen this year has been rather variable, and weaker candidates should be encouraged to make use of grid paper backing sheets in order to improve the quality of their sketches. Candidates who are proficient in the use of CAD packages can make good use of computer generated drawings to present the chosen design idea at the end of the objective. This generally improves the overall quality of communication and also extends the range of techniques used by the candidate.

Objective 4 – 'Product Development'

This objective continues to be the least well done of them all and many lower achieving candidates did not even attempt it. Candidates are required to develop their chosen idea into a final design and to give all details needed to produce the device. The objective differentiates well across the ability range with only the more able candidates providing sufficient details of sizes, materials, processes and components to be used.

Most candidates who attempted the objective produced a model of some description, but many failed to show how the model had helped in the development of the final design. The modelling section can also be used to trial and test materials, construction techniques and processes to be used in the final design. This would be of more benefit than a simple model that is not evaluated as it can be used to justify decisions made about materials and processes to be used. Some Centres used software packages such as ProDesktop to produce 2D models, but generally the use of CAD was quite limited this year. Whatever form the modelling takes, it is important that evidence is available at moderation, particularly as models are often lost or broken. This evidence could be presented in the coursework folder in the form of photographs that are clearly labelled with the candidate's name.

It should be possible to make the final device from the information given in this objective, but very few candidates gave sufficient detail to allow this. Cutting lists and working drawings are a particularly appropriate way to present details of the final device, but often the only drawing presented was a general sketch with few, or no, dimensions. This is another area where CAD packages can be used to very good effect and some of the higher achieving candidates produced computer generated detail drawings of the component parts of the final design. Details of the control system for batch production that the final device needs to have were missing in the case of all but the highest achieving candidates

Objective 5 – 'Product Planning and Realisation'

Candidates' approach to the planning element of this objective has shown some improvement, with only the weaker candidates presenting no evidence at all. Fewer candidates are now producing retrospective "making diaries" as evidence of planning and most candidates do present a plan of sorts, albeit often lacking in detail. A detailed plan should take account of materials, processes, health and safety requirements and time, and the most able candidates produced some good examples of this.

Even if a detailed plan is not presented it is important that candidates plan their work carefully and allow sufficient time for the device to be completed to the best possible standard. Completion of the device was again a problem for the weaker candidates, many of whom could present only a collection of unfinished parts for assessment and were, therefore, unable to access marks in all but the lowest range.

Much good quality work was seen in finished devices, particularly where castings or appropriate fabrication techniques had been used. In a number of cases Centres had been too generous in allocating marks to work where only a limited range of skills had been demonstrated by candidates. The higher marks in the making strand of this objective can only be justified where a well engineered device is completed to a high standard.

Objective 6 – 'Evaluation and Testing'

Most candidates who produced a completed device in Objective 5 attempted an evaluation, but few achieved high marks. In the first strand of the objective the device should be evaluated against the specification and this was done quite well by many candidates, with reference made to specification points and the use of resources.

The testing element, however, continues to be rather weak in most cases, and often no evidence of testing is provided. Testing should take account of the batch production requirement of the device and clear evidence of this testing must be presented where marks have been awarded. This evidence could either be in the form of photographs in the folder of the device being used or physical examples attached to the completed device.

Presentation

The standard of presentation varied considerably across candidates and moderators saw many approaches, ranging from folders that were entirely hand written to fully computer generated folios. The requirement is for candidates to present their work in a concise and logical way, and generally a combination of techniques is the most appropriate approach.

Grade Thresholds

General Certificate of Secondary Education
GCSE D&T Industrial Technology (Specification Code 1959)
June 2008 Examination Series

Component Threshold Marks

Component	Max Mark	A	B	C	D	E	F	G
1	50	-	-	27	23	20	17	15
2	50	26	21	17	12	-	-	-
3	50	-	-	25	21	17	13	10
4	50	30	25	20	14	-	-	-
5	105	81	70	59	47	36	25	14

Specification Options

Foundation Tier

	Max Mark	A*	A	B	C	D	E	F	G
Overall Threshold Marks	175	-	-	-	89	74	60	46	32
Percentage in Grade		-	-	-	17.83	21.93	20.24	15.18	13.25
Cumulative Percentage in Grade		-	-	-	17.83	39.76	60	75.18	88.43

The total entry for the examination was 443

Higher Tier

	Max Mark	A*	A	B	C	D	E	F	G
Overall Threshold Marks	175	132	116	100	85	65	55	-	-
Percentage in Grade		6.1	20.89	31.46	21.36	14.09	3.05	-	-
Cumulative Percentage in Grade		6.1	27	58.45	79.81	93.9	96.95	-	-

The total entry for the examination was 440

Overall

	A*	A	B	C	D	E	F	G
Percentage in Grade	3.09	10.58	15.93	19.62	17.95	11.53	7.49	6.54
Cumulative Percentage in Grade	3.09	13.67	29.61	49.23	67.18	78.72	86.21	92.75

The total entry for the examination was 883

Statistics are correct at the time of publication.

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