OCR
RECOGNISING ACHIEVEMENT

GCSE

Design & Technology (Industrial Technology

General Certificate of Secondary Education **GCSE 1959**

Report on the Components

June 2006

1959/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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Design and Technology: Industrial Technology (1959)

REPORT ON THE COMPONENTS

GCSE Industrial Technology 1959 (components 01 to 05)

Report on the Components taken June 2006

Introduction to the Written Papers (1, 2, 3, 4)

It was evident that a number of Centres had entered candidates for the Higher Tier when their performance would have been better suited to Foundation Tier papers. In some instances it was obvious that questions had not 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 as a means of optimising candidates' performance in the papers.

General Comments

- Where annotated figures are given in the stem of the question, candidates need to refer to the information carefully; often simple clues can suggest an appropriate answer.
- Where questions require annotated sketches it is important that candidates include appropriate technical notes, which may be rewarded even if the suggested solution is not viable.
- It is evident that where Centres have cross referenced the objectives set out for coursework with preparation for the written papers, candidates have benefited. For example, understanding of materials and cutting lists is rewarded in coursework Objective 4. Question 2 on the Foundation Paper 1 was designed to examine candidates' knowledge and understanding of this section of the Specification.
- A knowledge and understanding of jigs and indexing systems is of particular importance and should be applied in the workshop situation to raise candidates' awareness of batch production techniques. Involving candidates in short practical resource tasks is one approach Centres might consider.

Papers 1 and 2

General Comments

Both papers were accessed by candidates across the target range. The standard of candidates' responses remains varied. Some Centres had prepared their candidates well by encouraging them to develop their answers through notes and sketches. However, these two papers suggested some alarming gaps in pupils' practical workshop experience, for example, their familiarity with engineering lathes. The papers also highlighted areas of weakness in mechanical systems, standards and their application.

Foundation Tier 1959/1

Comments on Individual Questions

1 (a) Most candidates were able to identify the correct material, the only confusion of note being between the 'T' section and the angle. A few candidates introduced their own descriptions instead of using those given in the question.

(b) It was evident from the way this question was answered that a worrying number of candidates are not familiar with the lathe as a machine tool.

2 (a&b) The knowledge required for candidates to answer this question can be cross referenced with some of the requirements of Objective 4 in the coursework criteria. Again it was clear that not all candidates are familiar with materials and the interpretation of cutting lists. Most candidates scored some marks but a considerable number found difficulty with the hexagonal frame.

(c) A number of candidates made reference to ear phones rather than ear protection.

(d) Mixed responses, with many colours being mentioned, but all levels of ability had remembered blue.

3 (a) Not many candidates attempted this question. Many that did made reference to casting. The key to the correct answer lies in the annotated information.

(b) Many candidates that attempted answers recognised the need for maintenance and disassembly, but few produced a viable answer for joining the two tubes.

(c) Many candidates appreciated the need for lock nuts.

(d) Few candidates recognised the need to locate the material to ensure accurate repetition as part of the concept of batch production. Some of the simple but appropriately annotated answers frequently scored better marks than the more complex answers.

4 (a) Answers to this question clearly, and somewhat alarmingly, indicated how few candidates are familiar with workshop practice involving the lathe. Many confused centre drilling with countersinking operations.

(b) A disappointing number of correct answers. Those that did attempt the question often referred to millimetres rather than metric and few had any idea of how components are dimensioned.

5 (a)(i) Many candidates indicated some knowledge of Injection Moulding but a significant number wrongly referred to Vacuum Forming.

(ii) Few candidates indicated appropriate knowledge of industrial processes involved in the manufacture of the metal bucket.

(b) Many correct answers.

(c) Most correctly referred to galvanising and the few candidates who gave electro plating as their answer were also rewarded with 1 mark.

(d) It is important that candidates explain their answers. Use of the word ’strong‘ is not sufficient. Notes that referred to rigidity or increase in support were awarded marks.

(e) (i)(ii) Many answers indicated a limited knowledge of industrial processes.

(f) Most candidates focused on the requirements given in the bullet points of the question. This question was better answered than similar questions on past papers. Candidates showed improvements through the inclusion of webs in the design of the mould.

Higher Tier 1959/2

Comments on Individual Questions

1 (a) Answers to this question clearly, and somewhat alarmingly, indicated how few candidates are familiar with workshop practice involving the lathe. Many confused centre drilling with countersinking operations.

(b) A disappointing number of correct answers. Those that did attempt the question often referred to millimetres rather than Metric and few had any idea of how components are dimensioned.

2 (a)(i) Many candidates indicated some knowledge of Injection Moulding but a significant number wrongly referred to Vacuum Forming.

(ii) Few candidates indicated appropriate knowledge of industrial processes involved in the manufacture of the metal bucket.

(b) Many correct answers.

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(d) It is important that candidates explain their answers. Use of the word 'strong' is not sufficient. Notes that referred to rigidity or increase in support were awarded marks.

(e) (i)(ii) Many answers indicated a limited knowledge of Industrial processes.

(f) Most candidates focused on the requirements given in the bullet points of the question. This question was better answered than similar questions on past papers. Candidates showed improvements through the inclusion of webs in the design of the mould.

3 (a) There was a poor level of response to this part of the question.

(b) (i) Few correct answers.
(ii) Some candidates' answers suggested that they could explain verbally but were unable to use the correct terminology on paper.

(c) Some candidates were looking for answers that were far too complicated by including clamps and sophisticated hinged devices.

4 (a) The majority of candidates gained credit but it was only those candidates that annotated their solutions with the appropriate technical vocabulary that scored maximum marks.

(b) Most candidates realised that this part of the question was focusing on the pivot point, but few gained full credit because they did not include a locking system, e.g. a Nyloc nut.

5 (a) Very few candidates made any reference to standards and none made reference to systems or procedures.

(b) Some candidates gained 1 mark for making reference to control measures or checking procedures included in the manufacturing schedule but very few indicated any knowledge of Quality Assurance procedures

(c) One or two correct answers focusing on increased morale of employees and easy identification of faults.

1959 Papers 3 and 4

General Comments

There has been some improvement shown in the level of understanding of manufacturing processes, particularly those relating to production in plastics materials. Knowledge of basic workshop processes and materials remains weak in some cases, however, and a significant number of candidates lost marks as a result of this.

Responses to questions requiring the use of jigs to perform simple operations were disappointing this year and many design sketches lacked both detail and quality of communication. This was also the case in other questions where sketches and notes were asked for in order to illustrate candidates' answers.

Foundation Tier 1959/3

Comments on Individual Questions

1 (a) This question was generally well answered, with the majority of candidates being able to give reasons for plastics materials being used for children's toys. Most were able to name a plastic, although some simply gave the response 'Thermoplastic'.

(b) Few candidates scored full marks here. Sketches were often unclear and some candidates gave the purpose of the part rather than the reason for the use of plastic as asked for in the question.

2 (a) A surprisingly large number of candidates were unaware of the difference between Ferrous and Non-Ferrous metals, naming one from each group in part (ii).

(b) Most candidates were able to give a reason why some metals are expensive, this generally making reference to their rarity.

(c) This part of the question was well answered, indicating a clear understanding of the requirements of a design specification.

(d) Most candidates were able to give appropriate benefits of 'one-off' production, mostly relating to the uniqueness and quality of the product.

3 (a) Responses to this question were disappointing, with very few candidates recognising the opportunity for a simple cropping device to produce the shaped ends of the component.
Many solutions consisted of sawing jigs that would not produce the shape effectively, and a number of candidates mistakenly assumed that the component was to be bent along its length. In these cases marks were awarded where appropriate for those parts of the specification that had been fulfilled.

(b) Where candidates had mistakenly bent the component in part (a), this error was carried forward and did not affect the outcome of part (b). In general this part of the question was more effectively answered, although many sketches were of rather poor quality.

4 (a) The majority of candidates gave appropriate reasons for a computer controlled machine being suitable for making the nameplate, referring particularly to accuracy and speed of production. In a number of cases there was obviously confusion between CAM and CAD, this being made apparent in the responses to part (ii).

(b) Few candidates were able to give two quality control checks, but some made reference to checking sizes during production. The most common responses referred

to checks on the machine and cutting tool, often including cleaning the machine and sharpening the tool.

(c) A significant number of candidates did not attempt this part of the question. Issues such as cost and employee training/redundancy were given as responses but very few candidates were able to explain them sufficiently to gain full marks.

5 (a) Most candidates were able to make the knife more rigid but this was often by simply increasing the thickness of the plastic. In many cases more suitable responses were attempted but these were often limited by sketches that were poorly drawn or not clearly annotated.

(b) This part of the question was generally well answered, with most candidates gaining full marks.

(c) Very few candidates related the improved design of the cup to the requirements of the fast food restaurant referred to in the stem of the question. Most candidates simply added a handle to the cup with little or no explanation, whereas a tapered, stackable cup with a shaped or textured surface for grip would have been more appropriate. Where candidates had presented two simple solutions, these were awarded appropriately.

(d) Whilst the majority of candidates recognised that disposable cups produce more waste and litter, very few were able to explain the effect of this on the reputation of the company.

Higher Tier 1959/4

Comments on Individual Questions

1 (a) The majority of candidates gave appropriate reasons for a computer controlled machine being suitable for making the nameplate, referring particularly to accuracy and speed of production. In part (ii) most were able to name other workshop machines that can be computer controlled, the most popular being the lathe and milling machine.

(b) Few candidates were able to give two quality control checks but some made reference to checking sizes during production. The most common responses referred to checks on the machine and cutting tool, often including cleaning the machine and sharpening the tool.

(c) Candidates generally showed only a limited understanding of the issues relating to the installation of CAM equipment. Issues such as cost and employee training/redundancy were given as responses but few candidates were able to explain them sufficiently clearly to gain full marks.

2 (a) Most candidates were able to make the knife more rigid but in many cases suitable responses were limited by sketches that were poorly drawn or not clearly annotated.

(b) This part of the question was generally well answered, with most candidates gaining full marks.

(c) Few candidates related the improved design of the cup to the requirements of the fast food restaurant referred to in the stem of the question. Most candidates simply added a handle to the cup, whereas a tapered, stackable cup with a shaped or textured surface for grip would have been more appropriate. Where candidates had presented two simple solutions, these were awarded appropriately.

(d) Whilst the majority of candidates recognised that disposable cups produce more waste and litter, very few were able to explain the effect of this on the reputation of the company.

3 (a) Responses to this question were disappointing, with very few candidates able to produce a design for a practical jig to fulfil the requirements of the specification. Some candidates showed designs for press tools used in machines, whereas the stem of the question specifically asked for a jig to be designed. This suggests that candidates' knowledge of the use of jigs for simple workshop processes is generally rather limited.

(b) A disturbing number of candidates were unable to state three preparation stages required before brazing and in some cases this part of the question was not even attempted. Some candidates referred to marking and drilling the holes for the hooks, indicating that the stem of the question had not been carefully read and understood.

(c) A generally good response to this part of the question, with most candidates showing a basic understanding of the process. It was pleasing to note that a number of candidates described the industrial process of electrostatic powder coating rather than the simpler processes used in school workshops.

4 (a) This part of the question was generally well answered, although some candidates confused safety precautions for use with health and safety specification points.

(b) Very few candidates scored well on this part of the question as the majority of responses described the sand casting process rather than the die casting process with its re-usable moulds. In some cases candidates described the injection moulding process for plastics but failed to mention the similarities between the two processes that could have gained them marks.

(c) Only a limited number of candidates recognised the quick release mechanism mentioned in the stem of the question as the focus for the design exercise. As a result of this,

scoring in this part of the question was disappointingly low, as was the quality of sketching and annotation produced by many candidates.

5 (a) This was generally well answered, with most candidates able to give suitable reasons for injection moulding the case. Most answers focused on the speed of manufacture and suitability for high volume production but some candidates also made mention of the fact that complex shapes can be produced.

(b) Most candidates described design faults in either the product or the mould rather than manufacturing faults occurring during production. Few candidates gave reasons for the fault that related to problems in the injection moulding process itself.

(c) Most candidates scored well on this part of the question, referring mainly to the accuracy and consistency of products and also the overall quality of finished items. Some also made reference to the fact that the improved items can be produced quickly in large quantities.

(d) Very few candidates were able to give the type of clear explanation required at this level. Many suggested that computers were unable to produce fine detail, whilst others simply mentioned that one-off products were unique. There was very little reference to cost effectiveness or scale of production. Scoring in this part of the question was generally low.

1959/05 Report on Coursework Moderation

General Comments

Coursework projects seen this year represented the full range of abilities and there were examples of some very well engineered devices from a number of candidates. A limiting factor again proved to be the satisfactory completion of the device, with the less able candidates presenting little more than a selection of part-finished components.

The quantity production requirement also continues to present problems for some candidates and is all too often ignored completely, resulting in a reduced performance across the objectives. It should be pointed out that the device made by a candidate should be capable of producing batches of its product with repeatable accuracy. This should be considered throughout the project and evidence of the device's ability to fulfil the requirement should be presented in Objective 6 (Evaluation & Testing).

Where Centres devise a different capability task to those detailed in the Course Specification, it is essential that a proposal is submitted to the Board for approval prior to commencement of the project. This is to ensure that the proposal meets the requirements of the assessment criteria 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'

In this objective the candidate is required to enlarge upon the information given for the chosen capability task by 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 was not clearly stated and did not take into account the quantity production requirement of the device.

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 detailed research that is relevant to the design and use of the chosen device. It is increasingly common for the Internet to be used to collect information for research. Where this is done, it is important that candidates show how they have analysed and made use of the information, as simply presenting pages printed directly from a website will not be accepted as evidence of research. Many candidates produced questionnaires to collect data and, whilst this can sometimes be of use, it is essential that the information collected is relevant and is properly analysed.

Most candidates were able to identify existing products but these were often simply described rather than evaluated. 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.

A number of candidates continue to fill this objective with pages of theory notes on materials and processes. These are largely irrelevant at this stage of the project and would be of more benefit to candidates if used in Objective 4 to inform decisions made about the construction of the final device.

The majority of candidates produced a specification at the end of this objective, but often the specification lacked detail and made no reference to the need for quantity production. The

importance of a detailed specification cannot be over-emphasised as it is needed for reference throughout the remainder of the project and also to 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 some cases these were more detailed than strictly necessary at this stage. Details such as exact sizes, materials, construction techniques and standard components can be of more benefit in Objective 4, where marks are specifically available for this information.

Use of the specification to evaluate design ideas continues to be rather weak, with only the more able candidates evaluating ideas objectively. In the majority of cases the only reference to the specification took the form of a tick box or a 'mark out of 10', with no explanation given and no detail as to how or why a particular idea had been chosen.

Whilst pencil sketching is an entirely appropriate way to present initial design ideas, it is essential that the sketches are clear, annotated and easy to understand. Some candidates used computer generated drawings exclusively throughout this objective and in many cases this rather restricted the candidate's ability to present ideas effectively. In this objective CAD packages are particularly useful to enhance the clarity of the chosen idea, thereby extending the range of communication techniques used.

Objective 4 – 'Product Development'

In this objective the candidate is required to develop the chosen idea into a final design, giving all details needed to produce the device. The objective differentiates well across the ability range with the more able candidates providing detailed drawings and information regarding materials and processes to be used. In many cases the less able candidates do not even attempt the objective, but proceed with the realisation with little or no information to work with.

Most candidates produced a model of some description and in some cases 2D computer modelling was used to good effect. It should be pointed out, however, that candidates need to show how any models produced have helped in the development of the final design. A number of candidates used the modelling section effectively to trial and test construction techniques and processes. This enabled reasoned decisions to be taken regarding details of the final design and also allowed these details to be presented clearly. It is important that evidence of modelling is presented at moderation, particularly as models are often lost or broken; this evidence should preferably be in the form of photographs in the candidate's folder.

It should be possible to make the final device from the information given in this objective, but few candidates gave sufficient detail to allow this and in many cases there was no reference made at all to the control system for batch production. Cutting lists and working drawings are a particularly appropriate way to present details for making the final device and this is an area where CAD packages can be used to very good effect.

Objective 5 – 'Product Planning and Realisation'

Candidates should produce a plan of action for the making of their device at the start of this objective and very few candidates produced plans that could be considered detailed. In some cases there was no evidence of planning presented in the folder and it should be pointed out that all planning, however basic, should be included. A fully detailed plan will take account of materials, techniques, time, and health and safety issues in addition to specifying an appropriate sequence of operations.

Making skills across the whole ability range were seen again this year with examples of excellent work produced in some Centres. Completion of the device continues to be a problem for the weaker candidates, however, with the result that a considerable number presented only a collection of parts for assessment. It is important that candidates plan their work carefully and allow sufficient time for the device to be completed to the best possible standard.

Objective 6 – 'Evaluation and Testing'

This objective was rarely attempted by the weaker candidates, largely owing to their realisation being incomplete. Where these candidates did attempt an evaluation, this was often merely a description of their performance in the project. The more able candidates produced detailed and objective evaluations, relating their comments to the original specification.

It is important that evidence of testing is provided if marks have been awarded for this strand of the objective. This evidence could either be in the form of photographs included in the folder or physical examples attached to the completed device.

General Certificate of Secondary Education
Industrial Technology (1959)
June 2006 Assessment Series

Component Threshold Marks

Component		Maximum Mark	a*	a	b	c	d	e	f	g	u
01	Raw	50	-	-	-	27	24	21	19	17	0
	Weighted	35	-	-	-	18.9	16.8	14.7	13.3	11.9	0
02	Raw	50	-	23	19	15	11	-	-	-	0
	Weighted	35	-	16.1	13.3	10.5	7.7	-	-	-	0
03	Raw	50	-	-	-	26	23	20	17	14	0
	Weighted	35	-			18.2	16.1	14	11.9	9.8	0
04	Raw	50	-	27	22	18	13	-	-	-	0
	Weighted	35	-	18.9	15.4	12.6	9.1	-	-	-	0
05	Raw	105	-	79	68	57	46	35	24	11	0
	Weighted	105	-	79	68	57	46	35	24	11	0

Specification Aggregation Results

Overall threshold marks (i.e. after conversion of raw marks to weighted marks)

	Maximum Mark	A*	A	B	C	D	E	F	G	U
Foundation	175	-	-	-	92	77	63	49	35	0

	Maximum Mark	A*	A	B	C	D	E	F	G	U
Higher	175	128	112	96	80	63	54	-	-	0

The cumulative percentage of candidates awarded each grade was as follows:

	A*	A	B	C	D	E	F	G	U	Total No. of Cands
F'ndation	-	-	-	24.38	47.24	66.29	84.19	93.33	100	525
Higher	6.34	26.67	51.38	76.26	93.01	95.94	-	-	100	615

1140 candidates were entered for certification this series

For a description of how UMS marks are calculated see;
www.ocr.org.uk/OCR/WebSite/docroot/understand/ums.jsp

Statistics are correct at the time of publication

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