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Examiners' Report



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# Chief Examiner's Report

June 2006

There were two qualifications examined in this series at GCSE level.

GCSE Engineering (Double Award) and  
GCSE Manufacturing (Double Award)

Unit 3: Application of Technology (5318)

The award of this unit was split into six sectors with an individual paper for each;

5318/01	Printing and Publishing Paper and Board
5318/02	Food & Drink, Biological & Chemical
5318/03	Textiles and Clothing
5318/04	Engineering and Fabrication
5318/05	Electrical and Electronic, Process Control, Computers, Telecommunications
5318/06	Mechanical, Automotive

All six papers were harmonised for structure and difficulty.

Each paper had two sections. Questions in Section A related generally to information about the chosen sector. Section B illustrated a product from the chosen sector and questions were related to that product. The product was pre-released in November 2005 and acted as a focus for research in preparation for the exam. This year a Support Paper was available to help centres prepare for the exam. This paper was widely available on the website as a 'stand alone document' and was also attached to the pre-release material so every centre had access to this. It was also attached to this report for last year. Candidates were able to take their own research notes into the examination, but this was not to be submitted with the examination paper for marking.

The question paper within both sections was ramped in difficulty throughout.

All Principal Examiners' reports indicate that all the questions within the respective paper were accessible to their intended candidature, although all indicated that some lower achievers were able to access marks from the later questions in the paper.

Generally speaking those candidates who have had opportunities to study and research the target product answered well. It was clear in their responses that they understood the process of manufacturing/engineering when applied to their product and sector. Good candidates were also able to give variety in their responses across the range of questions.

In general terms a typical grade F candidate was able to identify products from a given sector, name and describe the use of components/symbols/equipment etc and in most cases link applications of technology to key areas of technology. In a range of other questions where explanations and descriptions were required often candidates were only able to give one word if not simple answers. Variations in answers throughout the paper were limited. Application of technology was also limited throughout their responses. Often no responses were suitable for the last question in the paper. They showed limited recall and application of knowledge and understanding.

In general terms a typical grade C candidate was able to gain a range of marks from the same areas and aspects of the paper as a grade F candidate, but with further detail in their responses to those questions demanding an explanation or description. They were able to explain a range of benefits of using CAM and apply this to compare with traditional approaches. Their responses when explaining the impact of control technology were limited. Good responses were given when explaining the aspects of the product through sketches and notes. Some were still unsure of the stages in manufacture. There was a wider range of responses when demonstrating their knowledge of the use of ICT in the design and manufacture of their product, although many were still limited.

In general terms a typical grade A candidate was able to access marks for many aspects of the paper including most of those achieved by grade C candidates. Their explanations and descriptions were complete and had many references to the "real" manufacturing and application of technology of their product. Their responses when comparing traditional and CAM methods were in detail and demonstrated knowledge of advantages. Throughout the papers candidate responses evidenced a variety of application of technology. Many candidates were able to explain the benefits of the use of quality control. Often their evaluations on the effect of ICT has had on materials supply and control and market supply and demand were well presented and they were able to demonstrate what they knew about the use of ICT in these contexts.

All of these points were considered during the awarding of the results. Overall there was an increase of around 6% in candidature over that for June 2005, with many new centres entering candidates.

The Support Paper that had been prepared for centres is included as appendix 1 of this report. This in turn will be updated and available to help centres prepare for the use of the pre-release material. A 'Revision Guide' is also available and can be found on the SEMTA websites [www.gcseinengineering.com](http://www.gcseinengineering.com) and [www.gcseinmanufacturing.com](http://www.gcseinmanufacturing.com).

Comments on individual sectors are given on the next pages.

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## Introduction

A team of twenty eight moderators was involved in the moderation of portfolios from 346 centres covering the two internally assessed, externally moderated units. There was a good level of consistency within the moderation process and this was assisted by the use of moderator training and standardisation events at which it was possible to share expertise and understanding and the tutorship of the four team leaders.

It was pleasing to note that an increasing number of centres provided very high quality samples of work that met the requirements of the specifications. However it must still be noted that many centres are misinterpreting the content of the specifications and are not conforming to the procedures laid down by the awarding body. Where ever possible moderators ensured that candidates were not disadvantaged by incorrect procedures, however where the specification was not interpreted correctly, as identified later in this report, candidates were inevitably disadvantaged. Much of this report reiterates problems identified in previous reports and moderators expressed their disappointment in the number of centres that repeated poor practice recognised in previous years.

The use of assignments designed specifically for other D&T type qualifications continues to be a problem. This qualification has its own assessment strategy and criteria, and these may be significantly different from those of other similar qualifications. It is important that centres design assignments that accurately address the assessment criteria. Moderators frequently reported that candidates had undertaken a worthwhile engineering activity that unfortunately did not address the assessment criteria and therefore did not provide evidence of achievement for this qualification.

A significant number of centres did not manage to send work to moderators before the deadline of 15<sup>th</sup> May 2006, and the moderation team endeavoured to deal with late work in order to issue results on time.



Some centres did not use relevant mark record sheets and therefore did not provide indication of where achievement had been recognised. The minimum requirement is that assessors should provide page numbers to indicate where evidence had been recognised. Where ever possible the Moderator applied individual judgement to identify where evidence was considered to have been recognised. However in these cases it was not possible to comment on the assessment decision with any certainty and moderators found it necessary to remark work instead of trying to agree assessment decisions. All portfolios should include an annotated Mark Record Sheet and the assessor should ensure that:

- All marks are recorded accurately and the arithmetic is correct
- The total mark is transferred correctly onto the OPTEMS or via EDI
- The candidate and the assessor, as appropriate, sign any required authentication.

It is disappointing to report that some centres failed to record marks accurately, moderators noting that marks recorded on candidate work did not agree with those recorded on OPTEMS forms and also that some centres were not able to provide accurate totals for marks awarded.

A significant number of centres did not provide any evidence of candidate Authentication and moderators spent considerable amounts of time contacting centres in order to obtain the necessary authentication forms. In many cases these forms were not correctly signed either by the candidate or the assessor/teacher.

### Presentation of Portfolios

It is disappointing to report that a significant number of centres did not present portfolios in an appropriate manner.

### All portfolios must include the following:

- A title page with the relevant specification name and number, candidate name, candidate number, centre number, and date:
- A mark record sheet for each unit to be moderated
- Evidence of Candidate Authentication
- Clear page numbering
- A contents list.

The title page must be in addition to the Mark Record Sheet which does not form part of the portfolio and is removed when the work has been moderated. In many cases work did not carry any means of identification after the Mark Record Sheet had been removed.

Portfolios should only include candidate work that evidences the required assessment outcomes, as indicated in the appropriate marking grids. Many candidates presented large amounts of non-relevant materials such as class work notes and research materials. This made the portfolios difficult to handle and did not enhance to overall marks in any way. **Centres must note that artefacts do not form part of the portfolio and should not be sent to moderators.**

Portfolios should be securely bound and the use of lever arch files is not recommended due to packaging, transport and security features. Some candidates work was received by moderators in a disordered state, causing accompanying problems in identifying appropriate evidence. This was particularly difficult when plastic wallets were used to contain large numbers of loose sheets.

Electronic evidence is currently not admissible for this qualification and therefore it is inappropriate to provide and make reference to evidence contained in electronic storage media such as 'floppy disks' and CD-ROMs.

### **Assessor Annotation**

The GCSE, GCE VCE and GNVQ Code of Practice requires that assessors record full details of the nature of any assistance given to individual candidates that is beyond that of teaching the group as a whole. Many assessors did not record the degree of assistance provided to individual candidates and significantly similar pieces of evidence for different candidates was often awarded different grades without the assessor substantiating the decisions. This frequently resulted in moderators awarding substantially lower marks due to the lack of appropriate evidence.

Assessor annotation to identify where achievement has been recognised is a mandatory requirement for internally assessed work. The minimum requirement for annotation is to complete the annotation column on the Mark Record Sheet by listing the portfolio page numbers where evidence can be found for each of the assessment criteria. A significant number of centres did not provide annotation and therefore moderators were not able to identify where assessors had recognised achievement. In these cases it was necessary for the moderator to remark the work in order to provide a reliable moderator mark for the available evidence.

## Witness Testimony

Whenever process skills are assessed, it is vitally important that Witness Statements/Testimony is completed by assessors in order to authenticate candidate work and provide evidence that candidates have achieved the level of performance required in the assessment grid. This Witness Testimony must be detailed and state exactly what a candidate has done and how this meets specified assessment criteria. General statements such as 'normal workshop safety rules apply' is not sufficient evidence to provide evidence of independent use of appropriate processes, tools and equipment, using them safely with skill and accuracy. It is strongly recommended that assessors use the appropriate forms provided in order to record in detail candidate activity and the degree of independence demonstrated in the activities.

**All witness testimony should be signed and dated by the witness.**

Witness testimony should normally be supported by other forms of evidence such as annotated photographs, records of measurements etc. In some cases assessors provided statements that candidates had met all required quality standards. In these instances the statements should be supported by records of measurements and comparison with the required standards. Similarly it is inappropriate for an assessor to record that a candidate worked safely at all times. Witness testimony must state details of candidate activity and equipment used accompanied by dates when observations were made. General 'all encompassing' statements are inadmissible.

It should be noted that the Mark Record Sheet does not form part of the candidate's portfolio and therefore it is not appropriate to use this form to record assistance provided and skills achieved.

## Assessment of the Units

These units are not to be subjected to continuous assessment since this may significantly disadvantage candidates. Centres are strongly advised to separate Teaching and Learning from Assessment.

The assessment of these units is best carried out after all teaching and learning activities have been undertaken. This enables candidates to perform to the highest possible degree of skill and independence. If teaching and learning takes place during the assessment activity it is difficult for candidates to work independently and also they will not have had the opportunity to practice their skills.

In general terms progression across the mark bands is characterised by:

- Increasing breadth and depth of understanding
- Increasing coherence, evaluation and analysis
- Increasing independence and originality.

Therefore summative assessment should occur after all teaching and learning experiences have been undertaken in order that the candidate may demonstrate the highest achievable levels of understanding and independence and originality.

When considering work to meet the higher mark bands it may be helpful for centres to consider the following explanations which are provided in the specification:

<b>Breadth:</b>	Range of ideas Alternative Solutions Range of information services
<b>Coherence:</b>	Structured and consistent work
<b>Evaluation:</b>	Judging the validity of results Self criticism Identifying solutions
<b>Independence:</b>	Free from outside control; not subject to another's authority,  Without support and guidance
<b>Originality:</b>	Inventiveness, ingenuity, creativity, innovation, imaginativeness, uniqueness.

Candidates achieved most success when they were presented with completely unrelated assignments for each of units one and two.

Many centres failed to award marks correctly as detailed in the Guidance for Teachers - Assessment Guidance - Awarding Marks. When assessing the evidence assessors **must** refer to the evidence requirements for the unit. Marks are awarded for evidence to meet the bullet points listed in the evidence requirements (listed on pages 22 to 27 for unit 1, pages 35 to 40 for unit 2). This guidance identifies **two** aspects to each assessment criterion, and also explains the procedures for awarding marks when a particular criterion has not been fully met. Therefore in order to be awarded full marks for any individual criterion a candidate must produce evidence to meet both of the bullet points identified in the specific criterion in the **evidence requirements** for that unit.

## Unit 1: Design & Graphical Communication

Moderators were again instructed to work very closely with the evidence descriptors provided in the Guidance for Teachers section of the specification. This section provides examples of the type and level of evidence required to meet each of the mark bands for specific assessment outcomes. Moderators also used the Portfolio Marking Guidance to identify the type of evidence required to meet mid band requirements.

Candidates must be **provided with a written client brief** which should be **included** in their portfolio.

It is not appropriate to allow candidates to choose their own design topic. However it is acceptable to provide candidates with a number of different briefs from which they are required to select **one** most appropriate brief, since this approach helps to ensure candidates undertake individual, rather than group, design activities.

The design activity must be based on an **Engineering solution**. This is **not** a general product design but should be based on an Engineering problem. Therefore the design options should include various methods of overcoming engineering problems. The solutions should include the use of some scientific principles and calculations. Those candidates undertaking general product design and mainly considering only aesthetic values were significantly disadvantaged.

Some centres continued to provide inappropriate foci for the assessment. Candidates required to 'design' articles such as 'personal communication devices' were significantly disadvantaged since they were unlikely, at this stage of development, to be able to consider any relevant engineering or scientific principles. Similarly those, candidates required to design articles such as CD racks, shelves and stands were frequently not able to consider appropriate scientific principles. Candidates **must** consider engineering features in order to succeed in this unit. Therefore they must be taught the appropriate scientific principles **before** undertaking the design activity.

Centres must recognise that this is **not** a 'design and make' activity, although the manufacture of a prototype could demonstrate that the product meets the clients brief, and could form a useful part of the presentation.

Many centres failed to provide the candidates with an opportunity to use typical standard symbols. A good design brief would require a candidate to consider mechanical and either electrical/electronic or pneumatic/hydraulic features. A product or service that only includes mechanical features would limit candidates' ability to achieve some of the higher mark bands. Candidates should be able to recognise and use symbols for components and features such as:

- Electrical/electronic components - resistors, thermistors, LEDs, capacitors, bulbs, batteries, motors, buzzers, variable resistors, diodes
- Mechanical features - holes, screw threads (internal and external)
- Dimensions - toleranced dimensions, radii, centres, springs
- Pneumatic/hydraulic valves, cylinders, reservoirs, pipework, filters.

In order to meet the higher mark bands the majority of the work should be produced by the individual candidate. Group work and brainstorming may be appropriate at the very beginning, but the generation of ideas and solutions must be that of the individual. Many candidates work showed evidence of a class approach with significant input from the teacher. This is acceptable for the lower achievers. However the approach is inappropriate for the higher mark bands. In some cases assessors awarded high marks when the candidates work recognised that group work, often lead by the teacher, had been undertaken.

**Assessment Objective a) an analysis of the brief with key features of the product or service**

The majority of candidates were only able to list the key features and the client's needs. In many cases the use of longer sentences was wrongly considered by the assessor to indicate greater analysis and explanation. It is pleasing to recognise that some of the candidates were skilled in the use of English Language, however in order to meet the higher mark bands candidates are expected to explain how identified key features and client needs would affect the design.

It is not expected that a candidate should explain all of the key features and client needs in order to be awarded higher achievement. However a candidate should have listed a significant number of the key features of the design brief and also explain the main client's needs and the main key features of the product.

The specification recognises the following as client's needs: Cost, Quantity required, Intended market, Timescales, Function,  
The key features include: styling, aesthetics, size, quality standards and performance.

**Assessment Objective b) details of the product criteria and production constraints**

Many candidates found difficulty in meeting the higher mark bands of this objective, concentrating significantly on aesthetic values.

The specification requires candidates to consider **product criteria** that include: criteria related to the products function, styling aesthetics, size, performance, intended markets and maintenance, and **production constraints** that include: criteria related to scale of production, cost, production methods and materials, quality standards and regulations.

A well prepared design specification helps candidates to produce suitable design solutions and to check that possible design ideas will meet the client's needs. Therefore it will be useful in achieving success against assessment criteria (c), (d) and (g).

#### **Assessment Objective c) a range of ideas and design solutions**

The majority of candidates again concentrated on aesthetic qualities and failed to consider engineering details or simple scientific principles. A significant number of candidates produced simple designs that failed to consider how the features could be achieved either from a manufacturing point of view or a functional aspect.

In order to meet mark band 3 candidates must produce 'imaginative' designs which do not rely on established market-leading products, or that offer a new slant on an existing product. A significant number of candidates researched existing products in order to select the 'best' solution. This approach did not necessarily meet mark band level 3, unless the candidate provided evidence of individual design activities.

The specification requires candidates to understand and use some scientific principles. The use of scientific principles does not require a detailed programme of study into 'engineering science'. However candidates should be able to recognise where scientific analysis is required and should be able to use simple modelling activities such as computer analysis of features such as structures, electrical circuitry etc. or the testing of models in order to determine suitable sizes. Simple statements such as 'it should be big enough' or 'it should be strong enough' do not indicate higher achievement.

In many cases candidates were disadvantaged by a being asked to design a product that was too advanced. It is recognised that candidates may be motivated to design a product such as 'a personal communication device'. However it is unlikely that they would have sufficient detailed knowledge to facilitate this activity. Similarly the design of bridges is likely to entail detailed stress analysis more suited to degree level candidates, and therefore would severely disadvantage GCSE candidates.

#### **Assessment Objective d) evidence of how you tested and selected the final design solution**

In order to meet this objective candidates are required to devise suitable methods to compare the characteristics and features of their different design solutions with the design specification in order to identify the solution that best meets the client requirements.

The use of simple tables with the awarding of arbitrary scores would be sufficient to meet mark band level 1. However in order to meet the requirements of mark band level 3 the specification recognises a need for objective testing and an explanation and justification of how the final design solution was chosen, and how it meets the design criteria.

It is important that candidates state clearly which design idea is to be selected as best meeting the design criteria. In order to meet this aspect of the assessment criterion at level 1, candidates are required to provide a brief outline of how their chosen final design solution meets the design criteria. This could be a simple statement recognising which design criteria are, or could be met. However, in order to meet the higher mark bands the candidate is required to provide a detailed description or justification of how the final design solution meets the design criteria. Therefore if this criterion were to be addressed in respect of a 'personal communication device' it would be necessary for the candidate to be able to show, not only that the product would work, but also that it meets criteria such as: a suitable range, battery life and weight etc. This would wither entail advance level mathematical modelling or manufacture of a working prototype. Each of these activities would be beyond the scope of a typical GCSE candidate **unless extensively supported and guided by the teacher**. This support and guidance would be likely to negate the achievement of the higher mark band.

#### **Assessment Objective e) evidence of how you selected and used engineering drawing techniques**

**It is not a requirement that candidates should make a verbal presentation to an identified audience.** However the final design solution should be submitted to a client audience and knowledge of the make up of the client audience will help candidates to meet the higher mark bands of part of this criterion. Therefore candidates may be significantly helped by a brief which identifies the make up of the group to whom the final proposals will be submitted.

Candidates often failed to state why they were using different techniques within the range. In order to meet the higher mark bands candidates should present evidence to demonstrate that they have considered the purpose of the drawing and the intended audience. In order to meet the higher mark bands candidates would normally be expected to use a significant number of techniques from the range identified on page 17 of the specification. This range includes: freehand sketches, perspective views, block and flow diagrams, schematic and/or circuit diagrams, orthographic projection, assembly and exploded diagrams. In many cases only two of the above lists were used by candidates who were wrongly recognised as achieving mar band 3 by assessors.

#### **Assessment Objective f) engineering drawings and technical details**

Once again many candidates provided high quality graphic illustrations produced both manually and with the aid of CAD. These illustrations consisted of various perspective drawings. However few candidates were able to satisfactorily use engineering drawing techniques to produce drawings that were suitable for use by a technical customer. This unit requires that all engineering drawings and diagrams comply with sector specific conventions such as BS8888:2000/BS3939-1. Candidates are not expected to have occupational competencies or to be working to commercially accepted standards. However all engineering drawings and diagrams should comply with sector specific standards and conventions. Many candidates produced drawings that did not have the minimum of title, name block, scale and borders.



Candidates must be given the opportunity to use common standard symbols for electrical, electronic or mechanical features. Therefore the candidates were significantly disadvantaged if required to design a product such as a CD-rack. In designing a CD rack it is recognised that a complex product may which used electrical/electronic systems may be designed. However this would most probably not meet the client's needs in respect of price, weight and function. In order to meet the higher mark bands candidates must be able to describe and/or explain, in some detail, the purpose of components and features used.

**Assessment Objective g) evidence of how the solution meets the criteria with suggested modifications to improve its fitness for purpose**

This assessment objective was best met by candidates who considered that they were to present their final design solution to a client either verbally or by a written presentation. They prepared statements to describe how their solution met the key features of the design brief and the design specification and presented their final solution as a completed project. This promoted the opportunity for feedback and for the candidates to identify relevant modifications to improve the products fitness for purpose.

Modifications should be made **in response to feedback**. However this feedback need not necessarily be provided at the end of the activity. The most practical, and industry standard, method of obtaining feedback is to refer to the client/s during the design process. Records of this contact could be used as evidence of having made modification in response to feedback.

## Unit 2: Engineered Products

The assessment requirements of this unit demand that the candidate produces one engineered product. Many centres produced evidence of producing a range of different products which were most probably made during teaching/learning activities. **This approach significantly disadvantaged candidates.**

The guidance for teachers explains that the product should endeavour to reflect the diverse realms of engineered products, for example by including mechanical and electrical components where feasible to do so. The 'What you need to Learn' section of the specification states that the chosen product must be able to use the following processes:

- Material removal, such as turning, drilling, etching, milling and grinding
- Shaping and manipulation, such as hammering, forming and bending
- Joining and assembly, such as crimping, soldering, adhesion, wiring, threaded fasteners, welding and brazing
- Heat and chemical treatment, such as annealing, tempering, hardening, etching, plating
- Surface finishing, such as polishing and coating.

Many centres continued to make products that did not meet these requirements. Some centres made several simple products each utilising one of the processes listed. Moderators were instructed that, for this year only, they should continue to accept any product as evidence to meet this unit. However in many cases candidates were disadvantaged because they were not able to provide evidence to meet some assessment objectives. Candidates who made products such as 'plumb-bob' encountered severe difficulties in meeting many of the assessment objectives and were therefore severely disadvantaged.

The most successful products were those that incorporated mechanical and electrical/electronic features. However some centres concentrated on local skills and specialities such as hydraulics and pneumatics with equal success. The least successful products were traditional apprentice tests such as plumb-bobs, Gee clamps and tool maker's vices. These traditional tests also tended to indicate lack of interest and motivation among the candidates. Centres are strongly advised to think carefully about the product specification given to the candidates and to ensure that it meets the unit range requirements.

**Candidates must be provided with a detailed product specification and the necessary engineering drawings to enable the product to be made to the required standards. Some centres again failed to provide candidates with the required information and therefore candidates were severely disadvantaged.**

In many cases the drawings provided by the centres did not conform to any sector specific standard or convention. Candidates are expected to be able to read and use drawings made in relevant orthographic projection which conform to relevant standards such as BS 8888:2000.

### **Assessment Objective a) how you used a product specification and interpreted engineering drawings**

Candidates were most successful when good, clear orthographic projection was used to provide manufacturing details and production requirements and a separate product specification was provided. However, very few assessors provided evidence of the degree of guidance and support needed by the candidates.

### **Assessment Objectives b) information about details of resources and processing requirements and c) information about production details and constraints**

Candidates were most successful when they were provided with a template for an industry standard production plan and were then required not only to complete this production plan, but also to provide justification for the selection of resources and processing requirements.

Candidates need to produce a **production plan** that identifies details of resources used, processing requirements, production requirements and production constraints. The specification recognises these as:

- **Resources** - materials, parts and components
- **Processing requirements** - processes, tools, equipment and machinery,
- **Production details** - sequence of production, scheduling, health & safety factors
- **Production constraints** - realistic deadlines, how quality will be checked and inspected, health & safety factors.

The use of standard vocationally relevant production plans is recommended, and these can be provided with additional notes to describe or to explain the aspects in order to meet the higher level mark bands.

Centres should recognise that production planning should take place before the commencement of manufacturing operations. In many cases there was evidence that candidates carried out planning retrospectively, using statements such as 'first we did...etc'. This retrospective completion of planning documents resulted in candidates being disadvantaged. Candidates should have had sufficient practice in manufacturing operations in order to enable them to make realistic plans from analysis of the drawings and specifications. Where candidates received substantial assistance from the assessor or other supervisors their achievement was not considered to be at the higher mark band.

**It is inappropriate for centres to provide candidates with a list of instructions.**

**Assessment Objective d) how you selected and used materials to safely make your product**

Engineering product specifications and drawings normally detail which materials are to be used in making an engineered product. This particular assessment objective relates to the candidates ability to select from a range of engineering materials the appropriate materials to meet the product specification and to use them safely. This could mean that a candidate can identify brass from a range of materials and choose a suitable piece of raw material to ensure the minimum amount of waste.

The evidence of safe use and skill and accuracy was most effectively provided by a combination of annotated photographs and witness testimony.

**Assessment Objective e) how you selected and used parts and components to safely makes your product**

Many candidates did not make products that were sufficiently complex and used parts and components. It was therefore difficult for them to achieve success in this assessment objective. Candidates were most successful when they made a product involving electrical/electronic components.

**Assessment Objective f) how you selected and used processes, tools and equipment to safely make your product**

Many candidates again did not provide sufficient evidence to meet the assessment decisions made by centres. This assessment objective was most successfully met by a combination of annotated photographs and witness testimony.

Witness testimony should state:

- What the Candidate did
- The degree of skill and accuracy demonstrated
- How they worked safely
- What safety equipment was used
- The degree of independence and confidence demonstrated
- The degree of assistance and guidance provided/needed.

The inclusion of a diary of candidate's activities in the manufacture of the product was often useful. However it should be recognised that these diaries need to be supported by evidence of assessment decisions relating to:

- The degree of independence demonstrated when selecting appropriate processes
- The safe use of processes, tools and equipment
- The degree of skill of skill and accuracy exercised.

**Assessment Objective g) how you tested your product and how it complied to the standards required**

Many candidates were awarded the higher mark band by assessors when they clearly had not consistently achieved the main standards required of the product. Similarly candidates should demonstrate objective testing against all requirements of the product specification.

The provision of a detailed product specification assisted many candidates to tabulate results of testing procedures to ensure that the product met the required standards. Unfortunately a significant number of centres still did not provide the candidates with sufficiently detailed quality standards and this disadvantaged the candidates significantly.

## 5318/01 Printing and Publishing Paper and Board

### General Comments

Overall this paper produced a wide range of responses across the whole paper and for the two sections within it. It was extremely pleasing to evidence that the majority of candidates attempted all questions and empty spaces were kept to a minimum throughout the paper.

### Specific Comments

#### Written Test

**Q1** The majority of candidates correctly identified the products belonging to the Printing and Publishing sector in part (a) and Paper and Board sector in part (b).

Centres are reminded that (a) asks for identification of products belonging to the printing and publishing sector and that (b) are products belonging to the paper and board sector.

**Q2** The majority of candidates correctly named and described comb or spiral binding but many were unsure of the correct term for 'saddle-wire stitching' and tried to describe what they saw in the illustration.

**Q3** A straightforward and generally well answered question. However, there was a surprising yet significant element who thought that automation was a modern material.

**Q4** The majority of candidates were able to name and explain an appropriate product. Many examples were taken from past papers or specimen assessment materials. However, a significant number of candidates insisted on using the excluded product, CD packaging, as the subject for the question. A generally well answered question overall.

**Q5** Most candidates were able to name an example of at least one communications technology and explain a benefit. A significant element incorrectly answered 'CAD' and 'CAM'. In part (b) many candidates were unable to explain a benefit to the consumer. This may be because they failed to read the question carefully and answered with another benefit to the manufacturer.

- Q6** A significant proportion of candidates were unable to name two traditional methods of manufacture that had been replaced by 'CAM' from this sector. Many were able to name a traditional method but could not relate this to a modern method. It is apparent, however, that many candidates are familiar with 'CAM' and consequently were able to give advantages of its use.
- Q7** Some good responses to the impact of control technology in terms of safety and efficiency were evidenced. The most common incorrect answer to part (a) was safety in the workshop i.e. wearing an apron and goggles etc. Some confused safety with quality. Part (b) initiated typical responses such as 'quicker' which were not backed up with any other statement.

## **SECTION B**

### **Based upon the mass produced CD packaging pre-release material**

- Q8** A well answered question for both parts. Candidates were able to effectively explain; using notes and sketches the function of both the jewel case and CD booklet. Presumably, CD packaging was a comfortable and familiar product for the majority of candidates.
- Q9** A number of candidates were unable to correctly identify the missing stages in the list. Many tried to give quality control as a stage. The correct sequence of stages is clearly outlined in the specification. Typically, these candidates were unable to correctly identify the stage where the CD booklet is folded and bound as assembly and finishing was not listed.
- Q10** Part (a) was generally well answered. However, many candidates gave generic responses such as 'plastic' when a specific material was required. Part (b) was extremely divided; those that had studied the processes in manufacturing CD packaging in detail were able to offer very detailed responses for screen-printing, those that did not were unable to gain many marks. The most common incorrect response was that screen-printing was printing onto the surface of the CD directly from the computer screen. Part (c) was generally well answered.
- Q11** In part (a), candidates who could apply their knowledge and understanding of the various stages to the actual manufacture of CD packaging were able to score higher marks than those who simply defined or generically described each stage. Part (b) was generally well answered. A significant number of candidates were unable to correctly identify, describe or explain the benefits of quality control in part (c). It is surprising that candidates are not thoroughly revising the use of printer's marks in publishing as they are a series of well documented and effective methods of quality control used throughout a print run.

- Q12** Many candidates were able to gain a few marks through this question but only a small number were able to gain full marks for either part by giving a detailed response. It is clearly apparent that a significant number of candidates do not have a sufficient specialist technical vocabulary to attempt questions in this part of the paper. Centres are reminded that the paper is ramped in difficulty and latter questions are therefore aimed at A grade candidates.
- Q13** The majority of candidates sitting the paper this year attempted this question. This is pleasing as it is always good exam practice for candidates to attempt all questions even with informed or 'educated' guess. Part (a) was better answered than part (b) with many candidates able to evaluate the use of 'Just in Time' systems in materials supply and control. However, a significant number of candidates were unable to differentiate between materials supply and market supply, often giving similar responses. The use of the Internet in part (b) was correctly identified but often candidates were unable to offer any explanation of sufficient depth. Many candidates incorrectly discussed the quality of the finished CD packaging as affecting the demand rather than the use of ICT.



## 5318/02 Food & Drink, Biological & Chemical

### General Comments

The general impression is that the paper worked well and differentiated between various candidates' abilities.

There was evidence that candidates did not fully understand 'control technology' and its applications and the links between manufacturers and consumers. There was also some evidence that not all candidates understood 'CAM' and 'CAD' and how it is applied to the sector.

Modern materials were known and referred to, but their functions and justifications for use were not always fully explained.

There was evidence that not all candidates were able to explain what occurred at each stage of the manufacturing process adequately. There was significant evidence of candidates not reading the entire question before starting the answering process. Generic responses were also given in the answers which did not relate to the sector.

### Specific Comments

#### Written Test

- Q1** Most candidates attempted this question many gaining maximum marks, part (b) tended to be more problematic; some candidates were not able to identify products from the biological and chemical sector. 'Chilli powder' was a frequent selection.
- Q2** Attempted by most candidates, but numerous low level responses i.e. use of 'whisk' often did not include air incorporation, changes in consistency etc. The use of the 'grater' produced higher level responses.
- Q3** The majority of candidates attempted this question a significant number gaining maximum or near maximum marks. There were instances of incorrect links (often on 1 or 2 terms).
- Q4** Most candidates were able to identify a product ((a) (ii)), but many gave only low level responses in part (ii) i.e. to eat, to sell. 'Emulsifier' was often stated in part (b) (i), but often they were unable to give an appropriate or relevant benefit in part (ii).

Part (c) (i) proved difficult for some candidates often giving quality control as a stage, and often provided a low level response to part (ii).

- Q5** This question was often poorly answered. Many candidates misinterpreted the term communication technology. 'CAD' and 'CAM' were often stated in part (a), and computers were also quoted by some candidates. Candidates often related benefits to the manufacturers rather than the consumers.
- Q6** The question was reasonably well answered, but significant numbers did not fully relate the manufacturing activities to the sector, some gave examples from other manufacturing sectors. In part (b) some candidates gave quality control as an advantage.
- Q7** Some candidate's did not answer this question or gave low level responses. In part (a) some candidates related to food safety or referred to safety roles. In part (b) 'efficiency' and 'control technology' were not directly related to by some candidates, but in general were well answered when attempted.

## **SECTION B**

### **Based upon the mass produced cartons of ice cream pre-release material**

- Q8** Some candidates did not use sketches and therefore did not achieve maximum marks despite often giving good explanations of the function of tamper evident lid and labelling. A number of candidates focussed solely on the tamper evident aspect of the lid rather than the overall function. The labelling part of the question was generally well answered.
- Q9** Product planning (part a) proved difficult to identify as a missing stage for a significant number of candidates. Part (b) was generally well answered by a large proportion of candidates
- Q10** A significant number of candidates either did not attempt the whole of the question or attempted only parts. Part (a) was generally well answered. Many candidates had learned the definition of an 'emulsifier', but some were unsure of which part of b, (i) or (ii) to put it, resulting in some repetition, and it was not always clear justifications of use. Part (c) responses often referred to the 'carton' rather than the 'cartons of ice cream'.

- Q11** This question was often not attempted. Many candidates attempting part (a) and knew the stages of manufacture, but were unable to provide sufficient detail to attract full marks. Low level responses and repetition often occurred e.g. (iv) making the product etc.  
Part (b) answers indicated that some candidates had some understanding of ICT and its relation to design and manufacturing, but often the responses were of a low level or were not related to the question.  
Part (c) some candidates did not specifically identify the type of quality control, but were able to describe and explain the benefits. Some candidates made responses relating to cartons, rather than cartons of ice cream.
- Q12** Where attempted candidates showed a good understanding of what was required, some candidates again focussed on the carton rather than cartons of ice cream.  
Some candidates did not focus on the impact of 'modern technology', but some attempted to describe the development and improved characteristics aspects of the question.
- Q13** This question was often misread or misinterpreted by candidates, resulting in answers not always relevant or related to materials supply or control (part a) or market supply and demand (part b).  
Majority of the lower level candidates often did not attempt this question.

## 5318/03 Textiles and Clothing

### General Comments

In general some candidates were able to access questions throughout the paper and many evidenced a good understanding of the Specification content. However, the more demanding questions at the end of Section B were difficult for most candidates and many gave inappropriate responses. Some candidates gave responses based on the previous year's mark scheme and did not gain marks because the demands of this year's questions were different from the previous year. Lower ability candidates often gave generic responses to questions, such as 'quick, fast, cheap' which gained them limited marks. Most candidates would benefit from being taught exam skills. Many lost marks through not reading the questions properly, e.g. answering 'CAM' related questions with responses related to 'design'. Some candidates had clearly, not used any research that they should have undertaken with the Pre- release product, in particular the areas covering liquid crystal coated fabric. Entries were lower than previous years and there were absences within those centres entered. At the grade 'A' boundary centres maintained high standards as they had in 2004. A large new centre entered this year, whose candidates were of lower ability, this contributed to the performance at the 'F' grade boundary.

### Specific Comments

#### Written Test

- Q1** Questions 1 (a) and (b) were well answered and many candidates achieved full marks.
- Q2** This was generally well answered although some did not know 'clip fastening'. Some just described the look of the components, rather than explaining how each is used.
- Q3** Again this was well answered and many candidates achieved full marks. Some lost marks through leaving a term unlinked.
- Q4** Part (a) (i) was generally well answered although some did not name a product but a material. In (b) (i) most candidates answered well, however the 'benefits' were less well answered, especially by lower ability candidates. Candidates often could not name a specific stage in (c) (i) and the advantage of control technology was often answered as a generic response rather than specific to the stage.

- Q5 Part (a)(i) was often not well answered, particularly by low ability candidates. However, some candidates could describe at least one communication technology and could explain its benefit. Many said email for (a) but others said phone or fax so were not always able to respond to the 'benefit' in an appropriate way. Only a few said video conferencing. Some could describe a use of communication technology in (b) in generic terms but many did not read the question properly in (b) and missed 'benefit to the consumer'. Most talked about the benefit to the 'manufacturer' rather than the benefit to the consumer.
- Q6 This question was often not well answered, particularly by lower ability candidates. Many could give an example of a traditional method of manufacturing, but could not trigger the second mark by naming the 'CAM' replacement correctly. They only repeated the traditional method with a mild elaboration.
- Q7 Again this question was generally not well answered, most candidates referred to 'safety in manufacture' in relation to generic safety not relating to control technology. Answers to 'efficiency' were triggered by simple answers of 'easier' or 'less waste' for minimum marks.

## **SECTION B**

### **Based upon the mass produced biker gloves pre-release material**

- Q8 Parts (a) and (b) were generally well answered and many candidates achieved full marks. There were some very good sketches but also some very weak ones. In (a) some only addressed the comfort not the movement or flexibility, so could not access all the marks. In (b) many did not address the added protection of the injection moulded top, so could not access all marks.
- Q9 Part (a) was generally well answered, although weaker candidates could not name the stage in (b).

- Q10** Part (a) was generally well answered, especially by candidates who undertook the research outlined in the Pre-release. These candidates could give a specific material for the biker gloves. However candidates from only one centre could explain a 'liquid crystal coating' and describe a reason for its use, all others related their answers to generic reasons for a 'coating'. Most candidates responded well to (c).
- Q11** Part (a) generally attracted elicited generic responses for all the parts, although the more able candidates could apply specific knowledge of textiles and clothing. Weaker candidates generally did not know the stages of production. In (b) responses were often generic about ICT in designing rather than specific to clothing manufacture. In (c) (i) many candidates responded correctly to a generic description of quality control but could not trigger the mark for the actual type of quality control used. Responses for (c) (ii) were generally answered well.
- Q12** This question was difficult for many candidates but well answered by those who understood the question. 'CAD and related software' and 'quicker design ideas through CAD' formed the body of most of the responses. Part (b) mainly elicited responses related to the quality, appearance or features of biker gloves.
- Q13** As in previous years this was the least well answered question in the paper. Very few candidates understood the question and gave appropriate responses related to the use of ICT in (a) an understanding of ordering materials using the 'internet' or had any understanding of 'Just in Time' ordering in regards to demand. Most candidates talked generally about the use of ICT in supply and demand in (b) as regards to stock awareness through the internet. Marks were awarded in this question where responses had connections with the demands and context of the question.

## 5318/04 Engineering Fabrication

### General Comments

Overall this paper produced a wide range of responses across the whole paper and for the two sections within it. It was extremely pleasing to evidence that the majority of candidates attempted all questions and empty spaces were kept to a minimum throughout the paper.

### Specific Comments

#### Written Test

- Q1** The majority of candidates correctly identified the products belonging to the fabrication sector in part (a). However, some candidates failed to pick up on the products in part (b) predominantly manufactured from metal i.e. the shopping trolley and ammunition boxes.
- Q2** Many candidates got confused with a nut and a bolt but were able to gain marks for explaining their use. Many candidates were also unable to name the pop rivet.
- Q3** A straightforward and well answered question.
- Q4** The majority of candidates were able to name and explain an appropriate product. Many examples were taken from past papers or specimen assessment materials. However, a significant amount of candidates stated a modern material that was not particularly suited to the product named. Part (c) gave candidates the most problems where they were unable to explain the use of control technology in the manufacture of the product.
- Q5** Most candidates were able to name an example of at least one communications technology and explain a benefit. A significant element incorrectly answered 'CAD' and 'CAM'. In part (b) many candidates were unable to explain a benefit to the consumer. This may be because they failed to read the question carefully and answered with another benefit to the manufacturer.
- Q6** A significant proportion of candidates were unable to name two traditional methods of manufacture that had been replaced by 'CAM'. Many confused 'CAM' with 'CAD' and gave design based scenarios. Centres would benefit from teaching candidates how considerable changes in manufacturing methods have made an impact upon modern manufacture. However, many candidates were able to give advantages of the use of 'CAM'.

- Q7** Some good responses to the impact of control technology in terms of safety and efficiency were evidenced. The most common incorrect answer to part (a) was safety in the workshop i.e. wearing an apron and goggles etc. Part (b) initiated typical responses such as 'quicker' which were not backed up with any other statement.

## **SECTION B**

### **Based upon the mass produced gas barbecues pre-release material**

- Q8** Generally well answered for both parts of the question. Many candidates were unable to gain the full three marks for each part as they failed to use both notes and sketches. Centres are reminded that this question is awarded up to two marks for either notes or sketches - both are therefore required for maximum marks.
- Q9** A significant number of candidates were unable to correctly identify the missing stages in the list. These stages are clearly outlined in the specification. Considerably more were able to correctly identify the stage where the hood is press formed.
- Q10** Part (a) was generally very well answered with fewer candidates correctly stating a suitable material for the burners. Common wholly inappropriate answers centred around the type of fuel which would be burnt i.e. gas, coal and firelighters. Part (b) was extremely divided; those that had studied the gas barbecue in detail were able to offer very detailed responses to the use porcelain-enamelled metal, those that did not were unable to gain many marks. In part (c) many candidates were able to apply their knowledge and understanding of modern materials to the gas barbecue effectively. However, it is clearly apparent that many candidates do not have a sufficient working knowledge of modern materials.
- Q11** It is a surprise that in part (a), as in question 9 (a), that candidates can not correctly identify the stages of manufacture of a product as outlined in the specification for this qualification. The candidates who could apply their knowledge and understanding of the various stages to the actual manufacture of the gas barbecue were able to score higher marks than those who simply defined or generically described each stage. For example, a common incorrect response to the Production stage was "this is the making process where the product is assembled". Here we need to have evidence of specific making processes and there is clearly confusion as assembly and finishing is an entirely different stage altogether. Part (b) was generally well answered, whereas the majority of candidates were unable to correctly identify, describe or explain the benefits of quality control in part (c). Many popular incorrect responses included the use of 'CAM' as quality control or confused quality with safety checks.



**Q12** Many candidates were able to gain a few marks through this question but only a small number were able to gain full marks for either part by giving a detailed response. It is clearly apparent that a significant number of candidates do not have a sufficient specialist technical vocabulary to attempt questions at this part of the paper. Centres are reminded that the paper is ramped in difficulty and latter questions are therefore aimed at A grade candidates.

**Q13** The majority of candidates sitting the paper this year attempted this question. This is pleasing as it is always good exam practice for candidates to attempt all questions even with informed or 'educated' guess. Part (a) was better answered than part (b) with many candidates able to evaluate the use of 'Just in Time' systems in materials supply and control. However, a significant number of candidates were unable to differentiate between materials supply and market supply, often giving similar responses. The use of the Internet in part (b) was correctly identified but often candidates were unable to offer any explanation of sufficient depth.

5318/05      Electrical and Electronic, Process Control, Computers,  
Telecommunications

General Comments

Overall, this paper enabled a good range of responses across the whole paper. The access was improved on the 2005 paper and candidates seem to have been able to interpret and answer questions drawing from their research into the manufacture of an LED head torch.

Specific Comments

Written Test

- Q1**    A very straight forward question, the majority of candidates were able to identify the correct sector for both part (a) and (b).  
The distractors in part (b) differentiating between some candidates.
- Q2**    Very good responses to LED, and “uses” with a high percentage of candidates receiving full marks. However, responses to the Capacitor and “uses” were disappointing.
- Q3**    Very good responses. Question posed few problems to candidates.
- Q4**    Parts (a) and (b) were generally well answered with candidates picking an appropriate product and modern material, although, often very generic. In part (c) responses were more sporadic and often poorly answered. Candidates were often unable to state a “stage” or describe one.
- Q5**    A straight forward question which was generally well answered.
- Q6**    Good responses to this question. Candidates generally had little problem distinguishing between “traditional methods” and “CAM” and giving suitable advantages, although, there was some repetition, i.e., fast, cheap, accurate etc.
- Q7**    A little disappointing. Although seemingly a straight forward question only average responses.

## SECTION B

### Based upon the mass produced LED head touches pre-release material

- Q8** The responses on the whole were very good. However, to gain full marks in each section candidates should include an annotated sketch with explanation. Centres should note that the quality of sketching is often unclear and did not help to support the explanation of the 'function'. Good responses to (a) used sketches of how the batteries fitted into the compartment showing polarity and spring etc. In (b) good responses showed LED array, switches, retaining straps, waterproof seals etc.
- Q9** Straight forward with many perfect responses.
- Q10** In part (a) candidates were able to name specific, rather than generic, materials for each part outlined in the question. Part (b) however was very disappointing. Very few, if any, candidates were able to give a satisfactory explanation of a semiconductor even though it is a widely used material in the sector. Good answers mainly were given for the "justification" for the use of LED's. Part (c) was answered well.
- Q11** Part (a) of this question was answered well by the candidates with most being able to describe appropriate "stages" in the manufacture of an LED head torch. Part (b) was also answered well with candidates correctly identifying types of ICT used in manufacturing. Part (c) was not so well answered and provided good differentiation between lower achievers and B/A grade candidates.
- Q12** Most candidates were able to attempt all parts of this question. Again there were considerable differences in quality of answer between lower and higher grade candidates as expected. Generally good responses in part (b), Part (a) gave candidates trouble relating to the "design and development" aspect of new technology.
- Q13** Candidates found this to be the most challenging question on the paper. However, some good responses were received, especially from the more able candidates, and, as such, provided good differentiation.

General Comments

Overall this paper produced a good range of response across the whole paper and the two sections within it. There was evidence that candidates did not understand fully the introduction of 'CAM' and application to the sector when compared to traditional approaches. The more demanding questions at the end of Section B were difficult for most candidates and many gave inappropriate responses. Some candidates gave general responses or based their responses on incorrect contexts and did not gain marks. It was extremely pleasing, however, to evidence that the majority of candidates attempted all questions and empty spaces were kept to a minimum throughout the paper. Lower ability candidates often gave generic responses to questions, such as 'quick, fast, and cheap' which gained them limited marks. Most candidates would benefit from being taught exam skills as often they do not read the questions properly.

Specific Comments

Written Test

- Q1** A good range of responses, well answered by many but distracters caught poorer candidates out in a few cases. The vast majority of candidates selected appropriate products belonging to the mechanical sector for part (a) whilst some dropped marks when selecting the products from the automotive sector. Compact disc and Cargo pants caught some out.
- Q2** Often candidates were confused between a nut and a bolt. A significant number of candidates were unable to state the correct name for the rivet.
- Q3** Generally this question was answered very well. One candidate whose total mark was 9 gained 6 marks from this question with a completely correct response. One candidate did however indicate they he did not know what 'control technology' meant by putting a question mark against the term. Control technology is an embedded part of this unit and should be emphasised throughout the delivery.
- Q4** A wide range of appropriate products were evidenced some from last year's trolley jack or the fire extinguisher from the year before. Some answers were very similar to the pre-release product such as 'hand pump'. Explanations were generally sufficient to be awarded a range of marks. Centres are reminded that products from this sector are wide and varied so candidates should always be able to gain some marks from these types of questions. Many generic responses rather than specific materials and benefits were seen in part (b). Candidates should, in this question concentrate on the product stated in part (a) and not the pre-release product. In part (c) some candidates did not give answers that emphasised the manufacturer.

- Q5** Most candidates were able to gain marks from this question from their general understanding of communications. A lot of the candidates however seemed to find this question difficult to answer, the response to the question was varied and indecisive, they seemed to indicate 'CAD' or 'CAM' as the answer. When an answer was given, i.e. mobile phone, their description of it seemed to have no relevance to it. They were not able to cope with the change of topic question from the previous four.
- Q6** Although often good responses were seen, many candidates were unable to give two varied answers between activity 1 and 2. Hence the advantages given in part (b) were also limited. Some thought that moving to the use of machines was appropriate when it had not a bearing on 'CAM' use.
- Q7** A significant number of candidates failed to attempt this question. Some good responses to the impact of control technology in terms of safety and efficiency were evidenced. The most common incorrect answer to part (a) was safety in the workshop i.e. wearing an apron and goggles etc. Part (b) initiated typical responses such as 'quicker' which were not backed up with any other statement.

## **SECTION B**

### **Based upon the mass produced foot pumps pre-release material**

- Q8** A simple question well answered question with many candidates able to gain all marks by using notes and sketches to explain the functions of the gauge and frame base. Marks were awarded for what the candidates communicated and not how they communicated.
- Q9** Whilst the responses to this question were better than in previous years some candidates still struggle to recall the stages of manufacture as outlined in the unit specification.
- Q10** Part (a) of this question provided an opportunity for many candidates to gain two marks, the responses expected needed to be specific materials although a range of 'steels' were accepted for the frame base. Part (b) caused problems for many. It is apparent that many centres had not covered composites in their delivery. Composites are modern materials and clearly stated in the unit specification. Only the most able candidates were able to gain full marks for part (c).
- Q11** Many candidates struggled to clearly describe the stages in part (a) and in context of the foot pump manufacture. The popular response to part (b) was the use of 'CAD'. Part (c) was poorly answered by many. A lot of responses needed the follow through rules to be applied before minimum marks could be awarded.

- Q12** Most responses by weaker candidates for both parts were very simple statements and only attracted minimum marks. The differentiation aspects of this question allowed those who knew about the impact of modern technology to be rewarded. Part (b) did however to be answered slightly better than part (a).
- Q13** Generally a poor response but as a progressive question it differentiated ability levels. Many wrote a lot for part (a) but failed to target their response to the effect on the needs of materials supply and control and therefore failed to score any marks.  
Most candidates found this question challenging and as such very few were able to access all of the marks. A pleasing aspect did exist in this year's paper that some lower achievers were able to gain 'odd' marks for this question. This may be one of the reasons attainment levels across the grades has improved.

## Statistics

### Coursework

#### Unit 1 5316 - Designing products for Engineering

Grade	Max Mark	A*	A	B	C	D	E	F	G
Raw Boundary mark	42	40	34	28	23	19	15	11	7
Uniform boundary mark	100	90	80	70	60	50	40	30	20

#### Unit 2 5317 - Engineering Products

Grade	Max Mark	A*	A	B	C	D	E	F	G
Raw Boundary mark	42	39	34	29	24	19	15	11	7
Uniform boundary mark	100	90	80	70	60	50	40	30	20

# Statistics

## Unit 3

### 5318 External examination with pre-release

#### 5318/01 - Printing and Publishing, Paper and Board

Grade	Max Mark	A*	A	B	C	D	E	F	G
Raw Boundary mark	100	83	74	65	57	49	41	34	27
Uniform boundary mark	100	90	80	70	60	50	40	30	20

#### 5318/02 - Food & Drink, Biological & Chemical

Grade	Max Mark	A*	A	B	C	D	E	F	G
Raw Boundary mark	100	87	77	67	58	50	42	35	28
Uniform boundary mark	100	90	80	70	60	50	40	30	20

#### 5318/03 - Textiles and Clothing

Grade	Max Mark	A*	A	B	C	D	E	F	G
Raw Boundary mark	100	80	68	56	45	39	33	28	23
Uniform boundary mark	100	90	80	70	60	50	40	30	20

#### 5318/04 - Engineering Fabrication

Grade	Max Mark	A*	A	B	C	D	E	F	G
Raw Boundary mark	100	89	78	67	56	49	35	35	28
Uniform boundary mark	100	90	80	70	60	50	40	30	20



5318/05 - Electrical and Electronic, Process Control, Computer,  
Telecommunications

Grade	Max Mark	A*	A	B	C	D	E	F	G
Raw Boundary mark	100	87	78	69	61	53	45	38	31
Uniform boundary mark	100	90	80	70	60	50	40	30	20

5318/06 - Mechanical, Automotive

Grade	Max Mark	A*	A	B	C	D	E	F	G
Raw Boundary mark	100	80	71	62	53	45	38	31	24
Uniform boundary mark	100	90	80	70	60	50	40	30	20

## APPENDIX 1

### Support Paper for Teachers of GCSE Engineering/Manufacturing Use of Pre-release for the External Examination Unit 5318

The examination for Unit 3 is offered as six different sector pathways. Centres are free to select which sector paper they wish to enter their candidates for. The deadline for entries to be received by Edexcel is 21st March 2006. The pre-release material is posted on the website by the end of September 2005 for the examination in June 2006. Where centres have estimated entries for the Engineering or Manufacturing qualification, a complete copy of the pre-release material will be sent to include a copy for each candidate. This pre-release will be in the form of a booklet and will cover all six sectors.

Teachers at new centres should ensure that their Examinations Officer has informed the ECC (Entries Department) at Edexcel of their intention to enter candidates. The pre-release consists of guidance for the candidates and notes to the centre. Staff at the centre should therefore open this material as soon as it arrives in the centre and read the information for all six sectors before deciding which sector is most suitable for them to support the needs of their candidates.

Generally speaking, Engineering is split into three sectors, Engineering Fabrication, Mechanical/Automotive, and Electrical and Electronic/Computer/Process Control/Telecommunications. Manufacturing is split into three sectors, Food and Drink/Biological and Chemical, Printing and Publishing/Paper and Board, and Textiles and Clothing.

Regardless of the route the centre is planning for the other two units in the qualification, the sector for this unit can be chosen to suit the best support a centre can offer rather than being defined by any preconceived ideas.

The product selected by Edexcel for each of the sectors is a product that is in general use, easy to recognise and easy to obtain. Most of these products would be of a reasonable price to purchase, such as the Cordless Electric Drill, or are already available or owned by centres or candidates, such as the Mountain Bike. Whilst the internet is a valuable source of information researching for this product, centres should not rely totally on this and may need to be diligent in their own research before deciding which sector is best for their candidates. For some sector products there may be a wealth of materials on the internet, such as food industry information. However, searching for manufacturers of traditional engineering type products may prove more difficult. Often adding the word "manufacturer" when carrying out searches using 'advanced search tools' on search engines supplies better results than not entering or using this word alongside the product name. After defining the sector specific paper, centres need to develop a support strategy for their students.

They need to consider the local support that can be gained from either industry, colleges or even universities, together with the information known to be available from the teacher's initial search and investigation to decide which sector paper to use.

In an area where manufacturer support for the exact product may be difficult to come by, such as the Trolley Jack in the 2005 pre-release, the centre needs to source local engineering support that uses similar processes and techniques to that found in almost any engineering manufacture. A typical way to support the candidates, in this case, would be to visit the local company before the planned visit, establish what the company can show/offer, and then match or simulate this to the manufacturing process in e.g., the Trolley Jack.

Different groups of candidates could be asked to get information on a particular aspect on application of technology from the company visit and briefed to give feedback to the rest of the group on return back to the centre. The teacher's role would be to draw out the similarities between the technology seen and that of the Trolley Jack. Back at the centre the product, in this case, the Trolley Jack, should be made available and dismantled. Again the teacher should be able to relate what is required for the manufacture and application of technology from that seen on any visits to local companies.

The delivery of the vocational curriculum requires that centres support candidates in the context of their course by applying work-related learning techniques to their area of study. Engineering and Manufacturing has the support of SEMTA and local SET Points, as well as all other local support mechanisms such as the Education Business Links Organisations (EBLO) and Work Related Learning Officers, either in schools or LEA. Food manufacturing, for example, has the support of appropriate trade associations and professional bodies such as, for the mass-produced sliced and wrapped loaves of bread in the 2004 pre-release, the Federation of Bakers, and similar baking industry associations may be useful sources. Often Vocational Learning Support Networks 14-16 are available and supported by the Learning & Skills Development Agency (LSDA).

Once the centre has facilitated the research required by the pre-release material and instructions, the teachers should encourage the candidates to consider the usefulness of any materials gained. Often materials will be found on websites; centres need to ensure that the candidates print/copy only pages that are relevant to that required and defined by the pre-release. They should not print masses of web pages. If studied closely the pre-release highlights the areas of knowledge required for the examination and can become the focus for collecting information. Just like an internally assessed unit, the candidates should be encouraged to produce a portfolio of their research. This can then be taken into the examination and used by the candidates when answering the questions in the paper. The research notes and sketches therefore need to be well organised, or they may be more of a hindrance than help. After studying the application of technology associated with the manufacture of the Trolley Jack candidates in 2005 were asked, for instance, to answer questions about coatings used. Therefore this was listed in the pre-release instructions as an important aspect to research for Section B of that paper. The experience of reviewing responses in previous examinations indicates that centres may be allowing candidates to take into the examination more than their own research notes and sketches, such as practice or previous examination papers, or materials from the Candidate Kit supplied by Edexcel as support materials.

This can damage candidate opportunities when they give a very detailed answer, obviously taken from the practice papers or Candidate Kit, but fail to put their answer into the context of the question being asked. Centres should think about their responsibility in this matter, as candidates may be disadvantaged and not be awarded marks to match their potential. In short, staff in centres should prepare themselves to prepare the candidates to achieve their full potential in the examination without employing strategies that will disadvantage them.



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