GCE

Design & Technology

Advanced GCE **A2 7822-3**

Advanced Subsidiary GCE **AS 3822-3**

Report on the Units

June 2009

3822-3/7822-3/MS/R/09

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Any enquiries about publications should be addressed to:

OCR Publications
PO Box 5050
Annesley
NOTTINGHAM
NG15 0DL

Telephone: 0870 770 6622
Facsimile: 01223 552610
E-mail: publications@ocr.org.uk

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REPORT ON THE UNITS

Chief Examiner's Report

General comments

Centres should be aware that this was the last opportunity to enter candidates for the AS examinations. There are now only two more opportunities to enter the OCR Legacy A2 Level qualification in Design and Technology.

June 2009 was the last opportunity to enter of candidates for the following Units:

2518 Case Study

2519 Product Study (Coursework)

2520/01 Product Design 1 and 2521/01 Systems & Control 1

2520/02 Product Design 1

2521/02 Systems & Control 1

The majority of entries for the AS specification in June was for resubmitted candidates. Centres are requested to check with their Examinations Officers to ensure that the correct specification has been entered for all candidates who are moving on to take the Legacy specifications at A2 for the last time.

The Legacy A2 level specification has two more substantive entries in January 2010 and June 2010. After these two further opportunities for candidates to submit work; it is not intended that the legacy specification will be available..

Candidates who are entered for Legacy A2 level in January or June should be prepared and entered for the correct specification:

2518 System Case Study

General Comments

There are still a small number of Centres not using the section divider sheets to structure the study. Whilst the majority of candidates benefited from the use of these dividers, a number did not ensure that they were inserted at the start of each section as required or bunched them together, the use of the dividers helps candidates to structure their studies and helps them to access marks in all sections.

Very few candidates did not present work in every section.
It is the Centre's responsibility to make sure the 2518 authentication sheet or CCS160 is present and signed by the teacher responsible.

The System Case Study is an investigation into the effectiveness of a system. It rewards candidates who have:

- clearly defined a system and its elements at the outset;
- accessed the system first hand;
- maintained a clear focus on establishing how effective the system is;
- clearly indicated all sources so that their own work is evident;
- made clear and realistic proposals for improvements.

The theme for 2009 set by OCR of 'The use of systems within the context of Entertainment' proved accessible to candidates. Most system choices were appropriate.

Successful studies were often those where candidates had not been over-ambitious in their choice of system. Where candidates had chosen a system at a smaller location they were usually more successful in obtaining the necessary information for their study. Those candidates who targeted larger organisations often struggled to get the detailed first hand information needed from people in management positions in those organisations.

It is worth repeating that it is crucial that candidates ensure that they have the necessary permissions to take photographs, conduct interviews, and carry out an in-depth investigation using a range of research techniques before starting the study.

Candidates within a number of Centres had studied systems within the same organisation, sometimes the same system, for example, sharing photographs and carrying out group interviews. In some cases, this resulted in a narrower range of individual work and limited evidence of independent thinking. This is not generally good practice. If Centres organise group visits it must be clear to candidates that they will need to gather a significant amount of their own research to enable them to access high marks.

Comments on Individual Sections

1. SYSTEM CHOICE, OBJECTIVES, AND RESEARCH PLAN (18 MARKS)

1.1 System Choice and Nature of the System (6 marks)

Most students were able to select an appropriate system. The better studies included system diagrams, and candidates clearly demonstrated a good understanding of the elements of the system based on initial research. Some candidates did not include a system diagram.

1.2 Objectives and Sources of Information (9 marks)

The more able candidates clearly stated the value and benefit of the study and to whom this was of value. They also presented realistic expectations as to the likely final outcome of the study, including detailed objectives and identifying numerous specific sources of information.

Weaker candidates gave generic objectives that in some cases had little relevance to the specific system they had chosen. Candidates should be familiar with the system at this point so that they are able to determine specific objectives relating to the effectiveness of that system. Main weaknesses included the lack of an overall aim of the study being explained.

Many candidates presented their objectives and sources of information in a tabular format. Research sources on the whole are not specific enough. Secondary research is that obtained from books, internet, government legislation, encyclopaedias, newspapers, journals, magazines, conference proceedings, and reports. A greater number of candidates included in their sources of information the relevant regulations, legislation, standards, codes of practice, instructions, manuals, policies, or national or local guidelines, against which the effectiveness of aspects of the system could be measured.

The sources and techniques for obtaining the information were often insufficiently detailed to access the highest marks. For example, 'internet', 'carry out a questionnaire', 'interview the people who work there', need to be more specific, and include website addresses, names of people to be questioned or interviewed, with an indication of that person's position in the company.

It is worth repeating that many candidates initiated the gathering of information then found that they could not access the sources to obtain some of the key information they had planned for. It is essential that candidates check that access to the sources of information and to the people and information about the system they need, including the taking of photographs, is available and permitted before starting.

1.3 Research Plan (3 marks)

In most cases, candidates used a tabular format, but not all included time-scales and sufficient detail. Many candidates still produce a plan for the whole Case Study whereas this section requires planning for research only. Better plans tend to be in the form of GANNT charts or table form. Candidates still need to be much more specific on the timescales for the research.

RESEARCH AND RECORDING OF INFORMATION (27 MARKS)

2.1 Range of Information (12 marks)

There was again some outstanding work in this section this year, with candidates using a good range of techniques to gather in-depth information from a variety of sources. A number of candidates gathered lots of information but much of it was totally irrelevant, not addressing the objectives set.

The research needs to be balanced between primary and secondary sources. A common mistake was that some reports were mainly one or the other. The primary research of the better candidates recorded the observations of the candidate; opinions of the system managers; opinions of the people who operate and maintain the system, and the opinions of the end users. Most candidates had gathered a number of Primary sources of information, marks tended to be lost where the information was lacking in detail and superficial.

Relevant secondary research in the form of legislation, regulations, and guidelines from governing bodies, was missing in a high number of candidate's work. In general, there is still too much reliance on Internet research. Information from this source needs to be carefully selected and edited; it should not be the only source of secondary information.

The majority of candidates included a Bibliography or clearly indicated the sources of their information this year.

2.2 Evaluation of Progress (3 marks)
The vast majority of candidates accessed some marks in this section. Some candidates correctly commented on how successful they were in obtaining the information required, and what changes were necessary to the original research plan.

2.3 Editing of Information (12 marks)
There was great variation in the way candidates edited information for inclusion in Section 2.1.

Simple points made a significant difference to the marks which could be awarded, such as labelling of photographs and diagrams; inclusion of page and figure numbers; cross referencing; annotated drawings; use of bullet points, tables, lists, and charts, for easy reference. Most candidates are annotating photographic evidence well.

Candidates should be discouraged from putting all research in appendices, marks are awarded for the creative editing of research, photographs and technical detail should be linked to floor plans and annotated. This should be done in the main body of the study. Where an appendix was used it was rarely referred to and used in the correct way.

There were many transcripts of interviews written out word for word or secondary sources in the main body of the text that should have been edited. The text should contain key points and summaries of relevant information gleaned from each information source.

ANALYSIS OF INFORMATION AND CONCLUSIONS (24 MARKS)
3.1 Analysis of Information (9 marks)

Candidates analysed the information they had recorded to varying levels of success. Many candidates scored highly, showing considerable skill in taking the information and contrasting and comparing specific results from different sources.

In general, some candidates demonstrated the ability to discuss, in a meaningful way, the management, quality assurance and quality control issues arising and made clear reference to the work presented in Section 2.1 using page and figure numbers. There are a significant number of students who make little reference to the key issues of QA/QC and management of the system.

Good responses reviewed questionnaire results with opinion, not just charts and graphs. All research should be analysed to access high marks. Some candidates did not express their own opinion as freely as they might have done. This Unit gives the opportunity and encouragement to candidates, supported by their knowledge of a system and their research gathered from an in-depth investigation, to be confident to develop and express a personal viewpoint. Weaker candidates were simply describing the information rather than actually analysing it.

3.2 Analysis of System (6 marks)
High scoring candidates used their original detailed systems diagrams and annotated them, sometimes using symbols or colours, to show strong and weak points. Some candidates, who had not provided a detailed system diagram in 1.1, struggled with this section. Candidates who failed to refer back to the original objectives or the system were also unable to score highly in this section.

3.3 Conclusions (9 marks)

Most candidates were able to identify strengths and weaknesses of the system chosen for study. In general, those who used a tabular approach to list strengths and weaknesses gained higher marks.
In the best studies, the table of strong and weak aspects of the system were supported with one or more paragraphs to justify conclusions.

PROPOSALS AND CASE STUDY EVALUATION (15 MARKS)

4.1 Proposals (12 marks)

This is a section that continues to let some candidates down, despite a high allocation of marks; significant time to research proposals to provide costings and technical detail, should be factored in.
Most Case Studies contained some realistic proposals but few candidates produced innovative, creative proposals. The increase in the use of photographs, diagrams, and sketches to illustrate them and research to support was pleasing to note.

Many candidates followed the advice given and offered a small number of fully detailed proposals, sometimes just two, rather than several with less detail. The need to include technical and cost details is emphasised as an important part of this section for candidates to access the very highest marks. This year most candidates were providing reasonable proposals.

The majority of candidates were scoring in the middle band of marks; this was mainly due to the lack of technical detail and costing / time implications.

4.2 Case Study Evaluation (3 marks)

This section was completed better than in previous years with much more thoughtful; commenting on the value of the study to others and to themselves in terms of Personal Social Development. Lower scoring candidates tended to provide superficial evaluations that merely evaluated their research and not the overall study. A few thoughtful and perceptive responses indicated that some candidates had gained a great deal from this Unit and would be able to apply lessons learned in future work and study.

QUALITY OF WRITTEN AND GRAPHICAL COMMUNICATION (6 MARKS)

The majority of reports were of a good standard and candidates had homed in on the fact that the case study is a piece of design coursework and should be visually interesting. The best candidates produced reports which were to “industry” standards and had been designed to include many aspects of presentation e.g. good quality colour photographs, proper Gantt charts.

As in previous years more attention needs to be given to careful proof reading and spell checking. Marks tended to be lost for poor written communication where proof reading and spell checking would have helped.

The layout of the pages is important, as is the selection of appropriate written and graphical methods of communication such as bulleted or numbered points, text boxes, pie or bar charts, graphs, sketches, or CAD drawings.
Candidates’ who had used a variety of appropriate techniques to produce a clear, coherent, and concise presentation of the sections, taking into consideration the likely recipient of the report, scored high marks in this section.

2519 Product Study (Coursework)

General Comments

There was a very small entry for this session of 68 Centres entering under 200 candidates. Approximately 50% of the total Centre entries represented individual candidate submissions. This session represented predominantly, but not exclusively, the work of resubmitted candidates. It was evident in many cases that candidates had not added a substantial amount of work to their previous submissions. In some cases it was hard to ascertain whether any additional work had been undertaken. Some Centres took the action of withdrawing candidates where it was evident that no additional evidence of work was being presented. Moderators were very appreciative of those Centres who carefully annotated any additional work submitted.;

Centres are encouraged to differentiate their marks to establish a reliable rank order for their candidates. A number of Centres entered candidates on the same mark when there was a clear distinction to be made between the candidate responses. Other Centres entered a small number of candidates with an unreliable rank order, where work was just within the OCR tolerance.

This was the very last occasion that Unit 2519 will be offered and there will be no re-submission opportunity for this Unit for candidates.
As Centres move forward from the old specification to the new they can do so with confidence that the good practice of the past will inform the future. All positive suggestions received from teachers at the well attended INSET courses have been included in the new specification and the least popular and problematic areas have either been removed or revised. For the last four sessions we have awarded the Product Study at the design threshold grade boundaries. This has meant that the raw scores and the UMS have matched. This achievement is down to a considerable amount of hard work by teachers and some excellent candidates who are a credit to their Centres.

Section by section guidance on Product Study requirements for Unit 2519 in June 2009
This is the last time candidates will be entered for this specification.

SECTION A	Analysis and design	(60 marks)
SECTION A1	Analysis of Chosen product.	(24 marks)

Examine the intended purpose of a product and identify the key criteria used in its design. (9) (2 x A3)

For marks in the top band all of the following should be addressed:

- Detailed description of the intended purpose of **one** product (not a range)
- Key Criteria used in the design of the product.
- The needs of the manufacturer.
- The needs of the consumer.

Where all four of the above have not been covered the Centre should consider awarding marks in the lower bands. Some candidates and some whole Centre groups are still considering generic groups of products. The first page of the candidate product study should state quite clearly and categorically what **specific, single product** has been selected for analysis. Better candidates awarded marks in the top band show a clear photograph of their single selected product being used.

Analyse the strengths and weaknesses of a product in comparison with similar products. (9) (2 x A3)

Good candidates should be encouraged to analyse the strengths and weaknesses of a *product* in *comparison* with similar products. Good responses often include a conclusion or summary, which relates similar products back to the single selected product. Poor responses often include charts and tables populated with Internet images with no identification of the strengths and weaknesses of the selected product. Candidates should be encouraged to show evidence of actually using a range of products, which are compared with the selected product.

Identify and analyse the moral implications associated with environmental, social and economic issues in the design and use of the product. (6) (1 x A3)

Moral implications should be considered in relation to the design and use of the product chosen for study.

. Advice may be sought from the Intermediate Technology Development Group now renamed Practical Action. Access to this is through their Sustainable Design Award Web site: (www.sda-uk.org). They are willing to help and have structured their advice to mirror our assessment criteria. Better candidates have clearly shown evidence of addressing sustainable issues.

SECTION A2 Initial Design of Improved Product. (36 marks)

Write a detailed design brief for improving the product in some way. (3) (1/3 x A3)

The design brief presented should relate to improving the single selected chosen product in some way. Centres should award marks in the lower bands where an improvement is not identified, or where the proposal is to redesign a complete product. Moderators still report that many candidates are still trying to improve too many aspects of their selected product. “Centres are still not ensuring that the change is a single change to a specific product, not a redesign or remake. Too often there are multiple changes to a type of product."

Develop and justify an objective design specification. (6) (2/3 x A3)

Specifications need to be detailed and justified, resulting from the objective analysis of the original product. Where there is little or no justification Centres should award marks in the lower bands. It can help if the justification for each specification point is clearly identified by using a different font size, style or colour- better candidates often use this technique, and it would help candidates in the middle and lower bands.

Centres should note that the brief should identify a clear improvement to one single selected product and the specification should be fully justified.

Use annotated sketching to generate a wide range of initial ideas, which explore possible improvements. (15) (5 x A3 max)

The expectation here, for marks in the top band, is that a wide range of innovative/creative initial ideas are presented which demonstrate a high level of development using high quality annotated sketching. Simplistic sketches with little or no annotation should be awarded marks in the lower band. All of the available additional marks gained by rewriting the specification have been awarded to this very important section. The expectation is that a specific improvement is

developed, a few candidates try to re-design a whole product, and this is not the intention of this section.

Evaluate ideas against the specification and justify the choice of one idea worthy of being taken forward. (6) (1 x A3)

It is important that Candidates evaluate their ideas against the specification and clearly justify decisions made. Where little reference is made to the specification, Centres should award marks in the lower band. No marks at all should be awarded where there is no reference to the specification. Centres should note that it is impossible for candidates to access these marks if the original specification is missing. Zero for the specification automatically results in zero for the evaluation against it.

Where candidates choose to annotate their ideas sheets, they must make it clear which specification points are being cross-referenced. Colour highlighting can help in this respect. Better candidates clearly rationalise the choice of one idea to be further developed.

Use a combination of text, graphical techniques and ICT, as appropriate to present information. (6) (All previous A3 sheets in section A)

The use of ICT must be included in the range of communication techniques used in the presentation of the folder; an over-dependence on the use of ICT/CAD should however be avoided. A combination of different approaches is to be encouraged. Centre marking of this section is usually accurate and consistent. Candidates should be encouraged not to over enhance the background of their ideas sheets if this impairs the clarity of presentation. Many moderators report that it is hard to read through some 'over decorative' backgrounds. Some candidates spend a disproportionate amount of time in enhancing the appearance of their pages, often at the expense of clarity.

SECTION B Product Development, Modelling and testing. (60 marks)

Analyse the influence of relevant design constraints on the proposed idea. E.g. issues of materials choice, manufacturing issues, ergonomics, aesthetics, environment, etc. (6) (1 x A3)

Candidates are required to show clear and careful consideration of the Design Constraints relevant to the product. For marks in the top band candidates should consider the following issues: materials choice, manufacturing, ergonomics, aesthetics, environment, etc. (other issues e.g. economics or sustainability could also be relevant). The best responses from candidates include an image of their selected idea for development; relevant constraints are often effectively presented by annotation.

Section A often ends with a final image of the idea selected for development. Careful planning of the folder could present this information on an adjacent facing page. A large minority of candidates make no formal response to this section. Centres who resubmit the work of candidates should audit the work to check whether the above issues have been considered. Where there is no response to an assessment requirement the Centre should award no marks.

Make sufficient first generation 2D & 3D experimental prototype models to establish the validity of the proposed idea in terms of physical requirements e.g. construction, movement, stability, strength, etc.; aesthetic qualities; suitable manufacturing processes and issues, suitability of materials or components. (36) (3 x A3 drawings, images, photographs)

To award marks in the top band evidence of a good range of 2D modelling should be presented -Formal drawings, CAD, unfolded/uncut nets, flat paper and card models, croc-clip circuits, textile patterns and ProDesktop images can all support the 2D section.
Card, Calico/Toile, Plasticine, polymorph, clay, foam, and the use of breadboarding techniques can all precede the use of more resistant materials in the development of a range of 3D models. Folders should not contain any 3D material.

It is important that all focus areas do respond with an appropriate range of prototyped developments. One single 'final prototype' is not within the overall ethos of the specification.

Make, using workshop tools a self contained test rig to formally test an appropriate physical requirement e.g. construction, movement, stability, strength, etc. Or the suitability of the proposed materials or components. (12) (2x A3) - including test results from summary

There is now some very clear evidence of innovative test rigs manufactured within the required time scale. The best rigs show clear evidence of accurate measurement and calibration. No marks can be awarded in this section unless a specially made **individual** test rig is used, and it should be pointed out that an assembly of technical or scientific equipment does not meet the requirements of the assessment criteria. Questionnaires, surveys, or the use of a model or models do not meet the requirements of the assessment criteria. It is expected that the test rig should take approximately three hours of workshop time to produce, and be capable of providing relevant and quantifiable results. Marks at the top end of the higher band should be reserved for those candidates who show clear evidence of calibration or quantifying their results.

Produce a summary of the results of this modelling which includes analysis of information gained from the models, details and analysis gained from the results of the testing with suggestions for further improvements to the proposed idea. (6) (2 x A3)

In addition to the presentation of test results, Candidates should summarise the results of their modelling and suggest further possible improvement to the product. There are three distinct sections to this assessment criterion. For marks in the top band, all three areas need to be considered. Better candidates show a clear annotated sketch of a further improvement.

2520/01 Product Design1 and 2521/01 Product Systems & Control 1

General Comments

This was the last 2520 paper. There were fewer candidates for this session, the majority of entries being retakes. There was a full range of attempts at this paper with some candidates achieving very high marks, producing very detailed, high quality responses. The majority of candidates fully complied with the rubric, only a small number answered all five questions.

Whilst most candidates read through the paper carefully, a number misinterpreted Q2(a) and Q2(b) (see comments on individual questions).
Some candidates did not give justified design requirements in answer to parts (a) of questions. Generic statements do not receive credit. 'Must be safe, 'ergonomically correct' and 'environmentally friendly' are not acceptable responses.
The design requirement must focus on the stated product.

Candidates should be reminded to look at the key requirements of questions. Some candidates underlined or highlighted key words in the question and responded appropriately.

A number of candidates assumed that later parts of the question are linked to the product given in part (a). Any expected links would be explicit in the question. The candidate may be able to draw on examples relating to the given product but in many cases this may not be appropriate.

Parts (d) of questions were generally answered very well. Some candidates however produced disjointed responses, unrelated statements or bullet points, and did not comply with the information given on the front page on how to respond to the instruction to 'discuss'.

Some candidates stated examples or produced supporting evidence without relating them or linking them to the question.

Questions 1, 3 and 4 were the most popular with question 2 the least popular.

Comments on Individual Questions

1 **(a)** Well answered. Most candidates responded correctly with justified design requirements such as 'must have an effective grip to prevent fingers slipping' and handle designed to fold flat for ease of storage'.

(b) Most candidates correctly focussed on the leverage design to enable sufficient pressure to cut nails, the shape of the cutter to provide effective and neat cut and the anthropometric consideration of using the clippers between thumb and finger. Some candidates referred to functional aspects with no link to the user and did not receive credit.

(c) Very few candidates gave three correct responses. Many simply referred to the need for manufacturers to keep making money. The best responses gave specific examples of throw-away products e.g. razors or use once products, for example, medical products such as syringes and needles, or tunnel borers. Many made reference to the influence of fashion changes.

(d) Well answered. The best responses focused on protection, cost and environmental concerns.

2 **(a)** Some candidates misread the question and produced responses based on the benefits of using ICT when designing. The question focused on the ways in which ICT could be used to model design ideas. The best responses included the identification of specific software for 2D and 3D modelling, virtual reality modelling and CNC applications.

(b) Generally well answered, most candidates referred to database applications for recording/monitoring stock, bar code scanning systems and the automatic ordering of low supplies.

(c) Most candidates had difficulty with this question. Very few achieved full marks. The best responses included the use of sensors (weight, dimensional tolerance, colour check) and computerised testing (impact, tensile testing).

(d) Very few candidates focused on the implications of the need to design products for ease of disassembly. The majority of candidates related the question to flat-pack furniture and the ease of assembly. The main purpose is for the ease of recycling parts and materials. The best responses included less use of adhesive/permanent fixings and the increased consumer appreciation of environmentally friendly products.

3 **(a)** Reasonably well answered although a number of candidates gave brief or simplistic statements such as ‘must have buttons’, which did not receive a mark. The best justified responses included ‘will get dirty, must be able to be washed regularly’ and ‘range of sizes needed to suit age range of school students’.

(b) Well answered with many candidates achieving full marks. Most candidates focused on price, fashion/trends and effective advertising/promotion.

(c) Whilst most candidates made very good attempts at this question, a significant number made limited reference to colour in product design. Some commented only on the need to attract prospective buyers. The best responses included specific reference to colour associations such as danger, safety, moods and the environment, and their relevance to product design.

(d) There were some very good responses to this question, with candidates raising issues such as cost implications, improving awareness, and comparing and contrasting methods of promotion. Some candidates focused on one issue only and therefore could not access the higher mark range.

4 **(a)** Well answered by most candidates with justified requirements relating to suitability for outdoor usage, effective positioning and robustness for garden usage.

(b) Very well answered by most candidates. Most referred to the flexibility of positioning, no need for cables, safety issues and environmental factors.

(c) Most candidates made very good attempts at this question. A few lost marks by rewording and repeating the same point three times. Best responses focussed on the space/shape required to house the internal components, the designated light capture and illumination requirements and the need to fix the product into the ground.

(d) There were a number of excellent answers to this question. Most candidates had a very good awareness of the implications of introducing solar powered systems. A number failed to achieve the higher mark range by focussing on one issue only, usually initial cost of set up, and failing to provide specific examples or supporting evidence to their discussion.

5 **(a)** Generally well answered although a number of candidates gave brief and generic statements such as ‘must be re-usable’, ‘must have ergonomic handles’ and must carry shopping’, all of which did not gain a mark. The most common correct responses were: ‘must be large enough to carry items from an average shopping trip’, ‘must be able to be folded for ease of storage’ and ‘made from a suitable material to prevent tears from the corners of shopping items’.

(b) Many candidates achieved full marks for this question. The most common correct responses made reference to reducing the amount of waste when manufacturing, reducing the amount of packaging required and using more efficient production methods.

(c) Many candidates were not aware of the term variable costs in relation to manufacturing. A significant number of candidates incorrectly referred to the need to reduce costs. The most common correct responses included reference to energy, wages and materials.

(d) There were a few excellent responses to this question. Many candidates, however, lost marks by raising issues relating solely to general waste disposal and did not focus on the specific problems related to industrial waste.

2520/02 Product Design 1

General comments.

The responses are ordered in accordance with the 'popularity' of the questions.
Overall, the performance of candidates followed a similar pattern to earlier examinations.

Part 'b' showed an improvement of understanding over previous cohorts, however it is important to remember the low numbers entered for this final specification.

Comments on Individual Questions

Q1. The most frequently attempted question.

(a) (i) Most candidates gained full marks for this section, Centres have clearly steered candidates away from unacceptable statements within this area.
(ii) Again reasonably well answered, most candidates were able to give two appropriate reasons.

(b) A lack of understanding and detail was demonstrated in this section, candidates did not tend to answer the question in its entirety leaving out the final fitting.

(c) A well answered section with in most cases text book answers, candidates seemed well rehearsed in identifying specific points with regard to wooden products.

Q3

(a) Very well answered by the majority of candidates.

(b) A well answered question, the majority of candidates were able to identify the complexity of the mould and the speed to name a few.

(c) A well answered question, candidates were able to access the full range of marks within this section.

(d) Again a well answered question, many candidates were able to identify the relevant points associated with the question offering suitable explanations with a range of examples to choose from.

Q2

(a) (i) Generally well answered although full marks were not always achieved by all candidates, some answers did not reflect a detailed knowledge of the metal alloys e.g. aluminium.

(ii) A well answered question, most candidates were able to identify the high performance characteristics citing lightweight and corrosion resistant as appropriate answers.

(b) Again It was good to see an increase in candidates' knowledge within this section this year, some very good answers were given, marks were substantially better in this section.

(c) Generally acceptable answers, many candidates tried to focus on the negative aspects and unfortunately were unable to explain the opportunities that these components were able to offer. As expected many focused on the bicycle discussing some relevant issues.

Q6
This was clearly a question that was used to supplement a lack of knowledge within the other areas by the candidates who answered it.

(a) Most candidates were able to give three out of four reasons in this section.

(b) A poorly answered question, most of the marks were picked up from generic answers related to the question, very few demonstrated an understanding of the process.

(c) A mixed set of answers for this question, many candidates again focused on negative aspects; however there were a few good answers.

Q7

(a) (i) Easily answered by most candidates.

(ii) Very few candidates were able to access this question correctly.

(b) Poorly answered by the majority of candidates, most candidates started off well but failed to focus on detail to pick up the available marks.

(c) Generally well answered, many candidates discussed relevant issues within the global economy, including environmental issues and ethical issues.

Q5 - Very few candidates answered this question.

(a) (i) Easily answered by all candidates.

(ii) Generally well answered by the few candidates who attempted this question.

(b) Candidates did not focus entirely on the question; those who answered were keen to include a printing process e.g. off-set lithography detracting from the question.

(c)

(d) Reasonably well answered by the majority of candidates.

Q4 - Very few candidates answered this question.

(a) (i) Generally well answered – valid reasons given.

(ii) Candidates did not demonstrate a full understanding with very few gaining full marks for this section.

(b) Some of the major manufacturing points identified, unfortunately candidates did not include relevant detail with some discussing the structure of cardboard.

(c) An accessible question for the majority of candidates who attempted it, many answers focused on landfill and environmental issues.

2521/02 Product Systems & Control 1

General Comments

The majority of candidates answered the examination very well. The candidates' choices of questions followed previous sessions' patterns. The main choices were the two Mechanical questions where candidates showed some very good knowledge of the specification. Very few candidates attempted the Pneumatics questions. There were a small number of Centres, however where the candidates failed to read some of the questions effectively. This is a real candidate performance issue because the questions are written to refer to detailed specification points. There was an encouragingly high standard in the quality of the answers in the discussion part question, with a good number of candidates writing relevant points, in this important six mark question. There was a still a problem with some candidates missing the marks for the specific example.

The performance of the candidates showed a wide mark range with good number of candidates scoring good or excellent mark totals. There were still some candidates with little grasp of the specification.

Candidates question choice in order of preference:-

3-4-1-2-5-6

Comments on Individual Questions

1)

(a)(i) Quite well answered by candidates
(ii) Well answered by most.

(b)(i) Well answered with many correctly identifying the pin numbers.
(ii) Mostly good answers but some marks lost with poor drawings.

(c) Surprisingly there were few correct answers with many candidates forgetting transistors and drawing short circuits.

(d) Few problems here.

2) (a) Well answered.

(b) Well answered.

(c) Calculations usually correct with some of the candidates using the inverted ratio.

(d) Well answered.

(e) Many candidates missed the main points of the expected answers to this question as it asked for the materials recoverable not just components.

3) (a)(i) Generally well done.
(ii) Generally well done.

(b)(i) Descriptions were varied but usually correct.
(ii) Well answered.

(c)(i) Generally well done.
(ii) Calculation was either correct or way out.

(d) Well answered.

(e) No problems here when candidates read the question carefully.

4) (a)(i) Well answered.

(b)(i) Surprisingly, a few incorrect answers.
(ii) Mostly correct answers here.

(c)(i) Well answered.
(ii) No problems here.

(d) Well understood and answered.

5) & 6) Very few candidates attempted these questions. Very limited knowledge of pneumatics technology demonstrated in most the answers seen, with a small number of very good ones.

2522 Designing and 2523: Making and Evaluating

General Comments

The majority of Centres submitted their marks to the Moderator using the correct CSF2522 and CSF2523 forms, although Moderators needed to contact several Centres after the due date in order to obtain MS1 forms, CCS 160 Centre Authentication forms, or the coursework itself. There were a number of arithmetic or transcription errors, and some candidates' folders were not clearly labelled with Centre Number and Candidate Number. Significant difficulties were experienced by Moderators when trying to contact Centres to resolve these issues, and in a number of cases this process took several weeks, with correct documentation and candidates' work in a few cases still not in the possession of the Moderator by the beginning of June. Centres are asked to check all documentation before forwarding to the Moderator, and to respond promptly should any queries arise.

A wide range of project titles had been chosen by candidates that were appropriate to the requirements of the examination. There was considerable variation in terms of complexity and demand, both for designing and making. There was a high percentage of 'safe' (and fairly predictable) projects which led to 'standard' solutions, and it was therefore refreshing to see some Centres and candidates venturing outside the comfort of a 'normal' project to tackle challenging design problems and explore and develop innovative solutions. Often the most inspiring work came from projects where there was a greater element of 'risk taking' and 'the unknown'. Many candidates seem to have a final design in mind from the outset of the project, and they should be encouraged to keep an open mind during the early stages of the project and be prepared to think laterally towards truly innovative solutions.

Whilst there were a number of large scale and sometimes over-ambitious projects which were often incomplete or not finished to an appropriate level of detail and quality, it was pleasing to see a greater number of more sensibly scaled projects this session. Projects that were realistic and manageable in the time scale allowed candidates to explore a range of options and then go on to refine their design before producing a high quality complete outcome commensurate with their abilities. However, Moderators reported that in a significant number of cases the overall complexity of the projects as executed and the range and/or depth of skills involved in the designing and making was insufficient for candidates to attain the marks awarded by the Centre. In such cases adjustments were necessary to bring the Centres assessments into line with the OCR standard. The correct choice of project is of paramount importance, and should arise from very careful consideration of the opportunities it presents (or does not present) against the Assessment Criteria for these Units. Detailed discussions between the candidate and the teacher are essential before a project is embarked upon which may disadvantage the candidate. In a small number of cases, the making work in Unit 2523 represented less than five hours practical work for the candidate, confirmed in the candidates' record of progress. Centres are reminded that however accurate or neatly presented, such work is unable to attract marks outside the bottom mark bands. The use of a laser cutter/engraver is not a quick way to a high grade.

A high standard of designing and making work was presented by many candidates.. A number of projects were innovative in concept and outcome, and creative work of this nature was appropriately rewarded by Centres.

Generic responses to the assessment criteria were common, where responses did not relate directly to the specific project and which lacked the focus and relevant detail required at A2 level. Such work was often over-rewarded by Centres, where marks in the lower bands would have been more appropriate.

Although the majority of Centres marked realistically and fairly accurately overall, a number of Centres required adjustments to their marks this session, for both 2522 and 2523.
In many cases, Centres' marks were lenient and on the edge of the tolerance band when compared with the OCR standard. Where Centre marks fell just outside the tolerance permitted, adjustments were necessary. Centres are reminded that although marks for individual sections may be just one mark lenient, if this applies to several sections there will be a cumulative effect on the total mark for the Unit which will necessitate an adjustment.

Candidates reflected industrial and commercial practice by their development and use of ICT and CAD CAM in various aspects of their coursework, and highly developed skills were evident in many cases. Overall, however, reference to industrial issues was generally weak, with few candidates exploring the commercial aspects of manufacture and the implications for design in significant detail. Although it is recognised that not every product would potentially be made in large quantities, reference to manufacturing in any sort of business sense, whether it be one-off or bespoke production, batch or volume production, was rare outside the final section of Unit 2523, when it was very much an add-on. The wider context for the product and its potential in the commercial marketplace should be considered from the start and be integral in almost all sections of both Units. Centres should note that marketing aspects are essential elements throughout the A2 coursework unit for the new specification.

There was widespread evidence of large sections of text and images downloaded or copied and pasted from the Internet. This was particularly, but not exclusively so, in Unit 2522 Section 2.4 Additional Research. If relevant to the project, edited, and correctly acknowledged, such extracts could earn credit, but in most cases they were not acknowledged. Centres and candidates are warned of the correct procedures and rules for the examination, and that the authentication statements signed by the Centre and candidate indicate that they *'have acknowledged all source materials in the work itself.'*

An increasing number of candidates are using PowerPoint software to record and present their coursework as an electronic portfolio, and this is a positive development in preparation for the new OCR GCE DT 'Product Design' specification. However, in some cases difficulties were encountered by the Moderator and the following points should be closely noted by those Centres and candidates intending to submit e-portfolios next year. A number of checks should be made before posting the CD's to the Moderator. The Centre should be ready and prepared to send a hard copy (i.e. a print-out of the PowerPoint) to the Moderator should any difficulties arise.

- E-portfolios are moderated / marked 'on-screen' and the backgrounds used by some candidates made it very difficult to read the text or to decipher the sketches and drawings. A green font on a grey background, or yellow text on a white background, for example, left the text barely visible. In several cases, coloured text on a multi coloured background left large chunks of text effectively invisible.
- Scans of hand sketches, mostly for the ideas section, were often not clear enough, and sometimes hardly visible on the screen. Some 'ideas pages' had a grey background from the scanning process. Clear sketches are required prior to scanning. The use of the scan settings or basic image-editing software is often a way of redeeming feint scans.
- In some cases the font was too small to be read 'on screen' in Slide Show view. A clear font such as Arial, and a minimum size of 10pt, is advised.
- In some cases, videos in the PowerPoint presentations would not run when 'clicked', mostly where the actual video file had not been included on the CD. It is crucial that candidates use 'Pack and Go' or 'Package for CD' within the PowerPoint software to assemble all related files in a folder prior to burning that folder of files to CD. Another point to remember is to include *'CLICK HERE for VIDEO'* or a large *'PLAY'* button clearly at the appropriate place. Some candidates helpfully included a key at the start of the portfolio so that the locations of videos were very clearly highlighted.

- The use of timings and animation caused delays where the Moderator had to wait for items to appear through a fade, or for images or text to 'arrive' on the screen. All timings and animation should be removed before copying final e-portfolios onto CD for forwarding to the Moderator.
- Large file sizes can be a problem. Several PowerPoint files exceeded 300Mb and took 10 minutes or more to open and settle on the PC before Moderation could begin. Where a number of high-resolution images or several videos were included on a slide, the transition to such slides often took over a minute. The resolution and/or quantity of digital images/videos on one slide should be kept to a reasonable level (without compromising clarity) and appropriate tools used to compress the overall file size of the PowerPoint where necessary.
- PowerPoint is the approved OCR format. Files should be saved in .ppt (PowerPoint Presentation) type/format. Files saved as .pps (PowerPoint Show) type/format presented problems in some cases where the moderator needed to look more closely at the candidates' work to verify the marks awarded by the Centre (e.g. where the font size was very small, or where the image quality was poor).
  In a few cases, tables or spreadsheets had been copied and pasted or imported into PowerPoint. Where these tables extended beyond the edge of the frame of a slide it was not possible to see the whole table. In .ppt fomat the whole table can be made visible in 'Normal View' but in .pps format it cannot.
- Helpful hyperlinks from a contents page to the various sections were used by some candidates and this aided navigation.
- Whether paper portfolio or e-portfolio, all pages or slides should be numbered. This is standard professional practice in portfolios of this nature and an important indicator of attention to detail and quality of communication at this Advanced level.

Further guidance for the new Specification and the use of PowerPoint to present coursework will be given at the OCR Training Courses during 2009-10. Visit www.ocr.org.uk/training for more details.

Comments on Individual Sections

1 RECOGNITION, INVESTIGATION AND SYNTHESIS OF DESIGN OPPORTUNITIES (33 MARKS)

SELECT AND INTRODUCE. Select and introduce a design opportunity, suitable for developing within the recommended time allocation of the unit, explaining in detail the reasons for choice; present an initial design brief and identify important, relevant issues for investigation (6 marks)

Design briefs were presented by most candidates, and were clear, but they were mostly 'candidate-focused' rather than 'market-focused'. Most candidates did not consider and state the potential benefits of the product in a broader, more commercial, context. It is important for the candidate to look beyond their personal needs to the needs of a specific client or user group, and beyond this to the appropriate issues relating to commercial production and the marketing of their product.

Explanation of the focus for the design opportunity was done most effectively with consideration of a need and potential for development. More photographic information of the chosen situation and context for the designing would be helpful, with an appropriate analysis of the need.
A number of questions such as the following need to be addressed in this section:

- What is the specific need? Is there a market for such a product? Who is the client or target market? Is it something that people will want to purchase, and why?

- What are the key issues which will need resolving if a successful and marketable product is to be designed?
- What will need to be considered or incorporated if the product is to be suitable for all parties involved - the designer, the manufacturer, the distributor, the retailer, the consumer?
- Who are the stakeholders who should be involved in the process of designing?
- What specialist input will be required if the need is to be fully met?

This section gives the opportunity for candidates to show their knowledge of and interest in the chosen context – why the choice of project is right for them. They should not underestimate the value of a positive and enthusiastic start to the project.

Centres assessments in this section tended to be slightly lenient.

TIME PLAN. Produce a realistic time plan for the unit, from initial investigation through to the working drawings, which includes as much detail as can be projected at this stage, together with evidence of adapting the plan to changing circumstances (3 marks)

This is one of the most commonly over-marked sections. In almost all cases Centres' assessments were generous; with very few candidates fully satisfying the assessment criteria to earn the highest mark.

Where the time plan is generic and could be placed in any A2 project folder, a mark of zero should be awarded. This applied to many of the responses. Simply copying and pasting the assessment criteria from the specification and adding a series of dates is insufficient to achieve a mark.

In general, time plans showed little evidence of being used in real time during the project or modified in any way. Some had clearly been completed after the project was finished.

Key stages, tasks, and timings for the particular project should be identified, and evidence of the plan being used as an ongoing stage-by-stage guide through the project is required. Project planning and management is crucial in an industrial context and candidates are expected to apply similar principles and practices to their coursework projects at A2 level.

SOURCES of INFORMATION. Identify primary and secondary sources of information relevant to the problem (3 marks)

By this stage, candidates should have a clear idea of the direction of their project, and should in this section include named specific sources of information (e.g. named people, organisations, websites and books) and specific techniques (e.g. interview or survey to be conducted in a particular way at a given location and time). Potential users of the product should be included. Specific relevance to the needs of the individual product and its target market is important for the highest marks to be achieved.

There were some excellent responses in this section from some candidates who had put in a great deal of work. These candidates had clearly researched their project focus before starting their folder work and had identified specific sources of information ready to put into this section. Many candidates, however, indicated general sources (e.g. 'the internet') and consequently gained only one mark. Candidates who made statements such as 'I need to find out -----', but gave no indication of where and how that information would be gained, were unable to earn any marks.

Candidates' work in this section was usually assessed accurately by Centres, with the majority gaining two or three marks.

STRENGTHS and WEAKNESSES in EXISTING PRODUCTS. Present and analyse edited research to identify strengths and weaknesses in existing products to provide information for later use (6 marks)

The majority of candidates copied and pasted images and product specifications from the Internet without really understanding the products, especially the materials used and their construction. This does not satisfy the assessment criteria for high marks, and candidates' work in this section was generally over-rewarded by Centres.

Unclear images from the Internet were very common and, overall, very little primary research was evident. Very few candidates looked at and analysed the sizes and thickness of materials or specific sizes and types of fasteners and fittings, and the level of detail covered was usually superficial. Disappointingly, very few students actually summarised their research to resource later decision making.

Candidates who earned the highest marks had personally examined existing products and solutions, often disassembling them, and had included diagrams and sketches of the products and their features alongside close-up photographs. Looking closely in person at a small number of items is of significantly higher value than studying a large number of items at a distance, both in terms of the useful information which will be gained and the marks that can be awarded.

IDENTIFY and ANALYSE CONSTRAINTS. Present and analyse edited research to identify the constraints caused by environmental factors, moral issues, social issues, cost factors and market opportunities, to provide information for use in the development of a design specification (9 marks)

Work in this section continues to be largely generic, and not specifically related to the project being designed. Many candidates communicated text book information and considered global issues, and did not focus on the specific issues relating to the designing of their particular product. Cost factors were rarely considered.

One of the key areas of research in relation to identifying constraints is that of the needs of the user. Some candidates did not carry out any target user or client research, simply focusing on wider environmental and moral issues largely regurgitated from the internet, or their Product Study from the AS course. Where supplied, 'user needs' were most often based on candidates' own experience with very limited justification.

The absence of key information such as details and dimensions of items to be stored or fitted into the product, or details of the intended location for the product, was prevalent. The 'constraints' are the restrictions, limitations, and boundaries imposed on the product by various issues. If a product is to be used by a certain group of people, be stored in a certain location, or contain certain items, the details of the constraints arising from these factors (obtained by interviewing users, by measurement, or by consulting relevant documentation) should be identified, analysed and presented by candidates in this section.

In general, Centres' assessments were lenient, and Moderators were unable to confirm the high marks awarded.

DESIGN SPECIFICATION. Produce a detailed and justified design specification from the objective analysis of research data (6 marks)

For high marks to be awarded in this section, candidates must state detailed requirements by reference to specific aspects of the product, including measurable targets (i.e. sizes, capacities, performance, features….) wherever possible. Many candidates presented generalised unjustified points such as *'materials must be suitable', 'materials must be of a high quality', 'the aesthetics must be appealing', 'must be lightweight', 'should be reasonably proceed', 'must look good', 'colour must be pleasing to the eye', 'shape must be simple',* and *'must use as little material as possible'* which could apply to any product, and which were insufficient to guide or influence the design work. Surprising comments included *'ergonomics is not an issue'*, and *'appearance/aesthetics is not important in my project'*

Those candidates who had thoroughly analysed the design need and carried out effective product and user research were able to present sound criteria that the product should meet. The design specifications produced by those having carried out limited research and investigation were not specific or detailed enough and were unsuitable as a basis for evaluation. Centres' assessments in this section tended to be lenient.

GENERATION, MODELLING and DEVELOPMENT of IDEAS (57 MARKS)

IDEAS with DEVELOPMENT to a PROPOSAL. Generate and modify a range of innovative ideas using annotated sketching and modelling, leading to a final justified proposal which takes into account aesthetics, suitability of materials, manufacturing processes and fitness for purpose (18 marks)

The standard of work in this section varied considerably, but Centres' assessments were generally in line with the OCR standard.

Most candidates produced a useful range of initial ideas, although many showed little innovation and were based on fairly obvious commercially available designs. In the best examples, Moderators saw innovative and creative design ideas explored and developed through an integration of freehand sketching with informative annotation, CAD drawings, images and modelling, and 3D modelling. The work of some candidates was truly exceptional and inspirational.

Candidates generally began well by showing a reasonable range of concept ideas but many were then let down by not showing a true progression and development of ideas explaining and justifying a final proposal. Candidates often tended to jump from initial concept sketches to a final detailed design with little evidence of significant thought. It was also quite rare for information gathered in Section 2.4 of this Unit to be acted upon in the development process. There was a considerable difference in intellectual demand. Candidates choosing very simple products with little complexity must be aware that considerable design exploration and detail will be needed if their work is to achieve high marks.

Greater attention to technical aspects would improve candidates' performance. Details of dimensions, materials, construction, components, and fittings, are needed to access higher marks.

Development using MODELS. Produce first generation 2D and 3D models to aid the development of ideas and to establish the validity of their chosen solution (9 marks)

Moderators reported a noticeable improvement in the quantity and quality of CAD modelling this session. A range of techniques were applied to the modelling of the overall chosen design and the development of joining and finishing techniques. A variety of modelling materials were used appropriately, and laser cutting and engraving CAM equipment was commonly used to produce a range of models.

A good number of candidates presented rendered images created in CAD packages to give 3D visualisations of the proposed solution, and it was pleasing to see that some candidates had used the modelling to inform their client about the design and to obtain feedback to aid further development and decision making. A significant number of candidates had used Google's free-to-download 'SketchUp', and it was evident that many candidates had accessed this CAD software and developed skills in its use independently.

Some superb modelling was seen, occasionally exceeding the quantity and quality expected. The most common failing was not to perform any meaningful evaluation of the models. Where this was the case, the opportunity for the models to inform future designing was lost. Where candidates did evaluate their models, clearer 'signposting' of the outcomes and usefulness of the modelling would have been beneficial.

Many candidates completed their design work and then made models to check the feasibility of the total design, whereas ongoing 2D and 3D modelling of the various design elements could have further improved and refined their overall design.
Photographic evidence was of variable quality, with blurred images in some folders.
Centres' assessments in this section were broadly in line with the OCR standard.

EVALUATION of IDEAS and MODELS. Evaluate ideas and models against the design specification and justify decisions for choice or rejection (6 marks)

Many candidates carried out the evaluation as a separate exercise. The real time evaluation of design development in the form of evaluative notes and comments alongside ideas, sketches and models is encouraged.

Professional designers evaluate their design ideas and proposed solutions through contact with their client or target market. Candidates are encouraged to follow this approach, which is likely to provide the most helpful feedback into the design development and achieve a fit-for-purpose final outcome.

Some candidates used a score or tick/cross type system to evaluate different ideas. This usually showed very little depth of thought and as such was not worthy of marks in the top band unless supported by analytical comments.

Centres' marks in this section were broadly in line with the OCR standard.

ADDITIONAL RESEARCH. Undertake and record the edited results of relevant additional research into information needed for further development of ideas including as appropriate, available materials, types and properties of materials appropriate to specific needs, suitable components, costings, ergonomics and manufacturing processes (3 marks)

Centres' assessments were sometimes lenient in this section, where work tended to be superficial. Images of materials, components or fittings from the internet were common, and in many cases there was limited evidence of the application of the information gathered to inform the development of ideas or the final solution.

Care should be taken to include an appropriate level of detail. To be of real benefit in the design development, for example, the research into a range of fittings should include technical information such as dimensions, specific materials, finishes, and method of fixing, as well as costs.

Most candidates included a separate sheet for this section at the end of sketched sheets. Centres are reminded that it is relevant and appropriate for the research to be presented in the places where the additional information is required, and where it forms part of the progression of ideas or design development.

Influence of DESIGN CONSTRAINTS. For the chosen solution, consider the influence of relevant design constraints, including environmental factors, moral issues, social issues, cost factors, ergonomics, market opportunities and user and manufacturer needs (6 marks)

Centres' assessments were broadly in line with the OCR standard, although there were not many cases of marks in the top band.

Most candidates were able to list the constraints that applied to their design, but few explained in detail how these constraints had influenced the final chosen design.

Overall, there was limited reference to the contents of Sections 1.5 and 1.6 of this Unit, and candidates rarely used annotated sketches and diagrams to explain the constraints impacting on their final idea. In some cases it was unclear at this stage which idea had been chosen to take forward. Many candidates did not give information on specific sizes, materials, and location restrictions. Careful and perceptive consideration of all relevant constraints and their influence on the chosen solution is required for marks in the top band.

Produce CAD WORKING DRAWINGS. Produce high quality working drawings using CAD, in a format appropriate to the type of product and which could be used by a third party with no further guidance (9 marks)

It was clear that the increasing availability of CAD packages had enabled students to complete the section more fully and in line with the requirements.

Whilst some responses were to a high standard of detail and complexity, CAD drawings were most often incomplete and lacked the detail that would have enabled a third party to manufacture the product. In such cases, marks in the lower and middle bands are appropriate. Marks should also be influenced by the overall complexity of the chosen design solution.

A few candidates presented hand drawn working drawings which could only earn marks within the bottom mark band. Candidates who had limited knowledge and experience of CAD were at a distinct disadvantage.

A number of candidates presented CAD 'virtual' 3D / pictorial images in this section and these helped to show the overall form of the product and the arrangement of parts. Surprisingly, some candidates presented high quality 3D images but had not converted these to 2D line drawings using the tools in the CAD software, usually involving just a few mouse clicks. The use of the dimensioning tools is equally straightforward.

Responses often lacked detailed dimensions, materials, and constructional details. For maximum marks, it is expected that the working drawings will include full details of the product – an assembly drawing with named component parts (with separate drawings of each part where necessary) and their materials and details for assembly. Candidates should be encouraged to add parts/cutting lists and notes to their working drawings to ensure all information is incorporated.

Centres' marks in this section tended to be slightly lenient when compared with the OCR standard.

Produce DESIGN FOLIO. Produce a fluent, well presented and informative design folio, using a combination of text, graphical techniques and ICT (6 marks)

This section was accurately assessed in most cases. Many candidates had produced visually excellent folders, had been awarded maximum marks, and Moderators were pleased to confirm this. Few candidates earned marks in the lowest mark band.

A range of hand techniques, ICT applications and CAD were evident in most folders, and the overall presentation of folders continues to improve, with the more able candidates producing visually stunning folders of near degree-level quality. Coherence and fluency are key factors for success, and candidates who clearly communicated their process of designing through the various sections scored high marks.

Digital technology featured strongly, with photography, scanning, 3D CAD animations and videos being used in the PowerPoint e-portfolios. Unfortunately, the quality of photographic images was poor in some cases.

2523 Making and Evaluating

1 PLANNING and MAKING (69 MARKS)

1.1 PLAN for MAKING. Produce a thorough plan for making which includes details of materials and processes to be used, health and safety issues, including a risk assessment of procedures and materials involved and quality control measures (9 marks)

This section requires a stage-by-stage plan of action for the making of the final outcome defined in the CAD Working Drawings presented in Unit 2522. Centres' assessments were generally in line with the OCR standard, although slight leniency was evident. In some cases the complexity of the tasks limited the marks possible. The marks awarded must reflect the demand and challenge involved.

Plans were generally presented in a 'standard' table format with headings for Materials, Processes, Health and Safety, Risk Assessment, and Quality Control. Some candidates still produced sheets of 'cut and paste' style plans where the same comments appeared in numerous 'boxes' and had very little relevance to the project and it's manufacture.

In many cases attention to Health and Safety and Risk Assessment was superficial. Comments such as *'take care when using the machine'* and *'ensure the correct safety procedures are followed'* were common. Centres are recommended to place a higher emphasis on these aspects of the planning.

Quality Control statements such as 'ensure a strong weld is produced' were common, failing to indicate the control measures required to achieve this, which might include correct settings on the equipment, cleaning and preparation of the materials, use of a jig to clamp pieces in position, and appropriate tests and trials to ensure the correct speed and position of the nozzle or flame being used.

1.2 QUALITY of OUTCOME. Produce a high quality outcome that demonstrates substantial making skills and innovation

There was a wide variety in the quality and scope of products. Centres' marking was often lenient when compared with the OCR Standard.

Some outcomes were of a very high quality. In some cases the project required more complex means of making for the candidate to be able to access the higher mark bands for A2 level coursework.

It is important that marks allocated to practical work reflect the overall level of demand and challenge involved, the level of skill demonstrated by the candidate, the quality of the making of the product outcome, and evidence of innovation. Evidence in the form of clear photographs of the whole and parts of the outcome, and an accurate record of progress, is crucial to support Centres' assessments. The total marks available in this section are **51 MARKS**, awarded in three sub-sections as follows:

1.2a SKILL LEVEL. Demonstrate substantial making skills (15 marks)

It is important that the level of making skills shown by the candidate is consistent with the demands of Advanced Level coursework. More important than the size of the outcome is the overall complexity, the breadth and/or depth of making skills involved. When

compared with OCR's benchmarking examples, Centres assessments tended to be lenient in this section.
There was a great variation in the range of skills evident. There was increased use of CAD and CAM, laser cutters in particular, and Centres need to ensure that candidates include strong evidence (e.g. in the form of clear digital photographs and stage-by-stage 'Print Screens') of their involvement in all stages of the process if the Centre marks are to be justified.

When marking candidates' work, a carefully considered judgement is required as to the level of skill that has been involved. Relatively simple making tasks - which have been completed with minimal planning and setting up, and a basic knowledge and understanding - should be awarded lower marks than more complex making tasks which have involved many stages of preparation and planning, detailed setting up, and a more advanced understanding and knowledge of the materials and processes involved.

1.2b PRODUCT. Produce a high quality outcome (24 marks)

'Quality' is an all-embracing word, and characteristics of a high quality product include: fitness for purpose, suitability for the intended market, appropriate and high quality finish, appropriate and accurate construction and assembly, economical use of materials, value for money, attention to detail, safety and ease of use, durability, ease of maintenance, visually attractive, together with evidence of a consideration of commercial issues such as manufacturing, packaging and marketing.

A range of products were submitted. Some were extremely well constructed and finished, and outstanding work was received from some Centres where the candidates had clearly enjoyed the making work and a good range of equipment and facilities had been utilised. There were some fine examples of contemporary products showing real design flair.

Moderators again expressed concerns over the quality of photographs, where details were often obscure.

The marking of this section was often lenient when compared with the OCR standard. Centres' assessments were sometimes extremely generous with very high marks awarded to well finished but undemanding products.

1.2c INNOVATION. Demonstrate innovation (12 marks)

Many candidates had explored and incorporated innovative features into their designing and making. Often an unusual jig/template or means of manufacture will contribute to the marks, as would an outcome from a candidate who has taken a well established design and re-ordered aspects of its design and making. Often a single innovative aspect, component, or method can demonstrate innovation. Supporting evidence in the folder is crucial to justify the Centre mark.

In the majority of cases, the Moderator was in broad agreement with the Centre's assessments, although in some cases the Moderator had difficulty finding evidence to support the Centre's high marks where a conventional design had been produced using conventional techniques.

1.3 RECORD of PROGRESS. Record and evaluate progress during making, incorporating changes to the plan or the intended outcome if necessary; show evidence of the use of well planned quality control processes in the making of their product and the use of a variety of appropriate materials, tools and equipment in a safe and efficient manner (9 marks)

Centres' assessments were broadly in line with the OCR standard.

Real-time recording is the key in this section, and there is no real substitute. The need for candidates to be organised and to keep a careful and detailed record as work progresses cannot be over-emphasised. Some candidates did not include enough detail or break down the record of making into small enough stages and were unable to earn high marks.

Annotation accompanying digital images (and, in a few cases, videos) was often descriptive, the requirement to evaluate not being properly addressed. The intention is not to simply record progress but to assess each stage of the making in terms of the time taken, the level of difficulty, the appropriateness and effectiveness of the equipment used, the quality and accuracy of the results, and how that part of the process might be improved. The best responses included detailed comments of what went well and diagrams of changes made.

2 TESTING and EVALUATION (21 MARKS)

Important note:

These last five sections (2.1 to 2.5) were often rushed and of a lower quality than the foregoing sections, with candidates allocating insufficient time to satisfy the specific requirements of each section. Nearly 12% of the marks for the A2 coursework are allocated to these five sections. Centres are reminded that in the new OCR GCE D&T Product Design specification, A2 Coursework Unit F523, a much larger percentage of the marks, 27.5%, is allocated for sections that follow the making. This has very clear implications for the scheduling of the various coursework tasks.

2.1 User TESTING against Specification. Show evidence of user testing of their final solution against the specification to objectively identify strengths and weaknesses (6 marks)

Overall, Moderators reported better responses than previously, with greater evidence of testing in the real environment rather than in the workshop, and improved cross referencing between the Design Specification points from Unit 2522 and the finished product.

Candidates that did not formally focus on their specification were unable to comment in detail on the strengths and weaknesses of their final solution. Personal observations and thoughts against the specification points were still common rather than objective comments based on testing. At this level it is expected that evaluation and testing will subject the product prototype to scrutiny regarding all aspects and phases of its life, including its suitability in all places and situations it may be used, situated, stored, packaged, or transported.

Responses were often limited by the quality of the original specification. More candidates seemed to be aware of the need to list explicit strengths and weaknesses, and this was an improvement over previous sessions.

Candidates who had centred their project on the needs of a client or specific users from the outset of the project were able to obtain valuable and detailed feedback from testing carried out by those individuals or representative groups in the intended environment for the product. The best responses included results of testing recorded in graphical or diagrammatic form.

Centres' assessments in this section were usually in line with the OCR standard.

2.2 Response to EXTERNAL EVALUATION. Show a positive and responsive attitude in the face of first hand external evaluation (3 marks)

Some external evaluations were reported by the candidate with no evidence that any external person had actually been in contact with the product. Centres are reminded that unless there is clear evidence that an external person has seen and tested the project in person (e.g. a headed letter scanned or pasted into the folder) high marks should not be awarded. 'Hear-say' evidence is not acceptable. A reported conversation or quotes from friends or relatives do not merit top marks.

There were many essay type responses which did not highlight and address key issues, and in general, Centres' marking in this section was lenient.

2.3 MODIFICATIONS to one-off prototype. Present detailed drawn modifications to improve the identified weaknesses in their one-off prototype (3 marks)

The best work in this section included well presented and detailed annotated sketches and diagrams of improvements to the prototype, relating to the candidate's own and third party evaluation of the prototype product. Responses were noticeably better where candidates had clearly identified strengths and weakness in the previous sections.

In general, candidates' work was accurately assessed by Centres.

2.4 COST ANALYSIS and comparison. Prepare a full cost analysis and compare this with previously conducted market research (3 marks)

Centres' marks in this section were usually accurate.

Consideration of the costs for the one-off prototype, the likely commercial manufacturing costs, and the likely selling price for their product, relating them back to their own research prior to the designing, are the key requirements required in this section.

2.5 POTENTIAL and MODIFICATIONS for commercial manufacture. Show a good understanding of the potential of the product for industrial production and present drawn details of the modifications necessary to make the prototype suitable for commercial manufacture (6 marks)

An honest appraisal of the commercial potential for the product is required in this section, to show a clear understanding of the commercial and marketing issues involved, the likely scales of production, and to explain, justify, and show using annotated drawings the modifications needed to the design of their prototype.

Many candidates were unable to show how the design of their prototype would need to be modified for commercial production. Lengthy text, plus images from the Internet, was common, and meaningful drawn design modifications were rare. The majority of responses focused on manufacturing changes rather than design changes, e.g. pressed metal to plastic injection moulded.

Labelled diagrams of the injection moulding process were presented in the majority of folders, typically with little or no reference to specific components of the product that would be injection moulded and how the design of those parts would be affected.

Centres' assessments in this section were usually lenient, with the majority of candidates deserving half marks or less.

2524/01 Product Design

Section A

General Comments

All questions were attempted with numbers 1, 2 and 3 being the most popular. The less popular questions were 4, 5, 6 and 7. There was little variation in the number of candidates attempting to answer these less popular questions. It was noted by the examiners that a large number of candidates were able to correctly address the actual discussion points being asked in part (c) and these were better answered than in previous examinations. Part (b), that asks questions involving various processes in commercial settings, continues to cause concern. It is pleasing to note that candidates are beginning to address the process part of the questions in a commercial context. However, there is still concern that a significant number of candidates are now appearing to find difficulty in answering part (a) of the questions where the suitability of simple materials was being examined. It is also a concern that the standard of writing and the illegibility of some scripts are becoming a major problem with several scripts having to be referred to the Principal Examiner. There is a risk that scripts that are difficult to read do not allow the candidate to communicate their answers effectively. Centres are again recommended to instruct their candidates to read through the whole question paper before selecting the questions they attempt. Centres are also encouraged to prompt their candidates to underline the central points on the question paper. This action will help the candidates to focus on the important key words of the question and not put their own interpretation on the question.

The Centres that performed well in this examination had covered, in depth, the process of working in selected materials and their candidates were able to enhance their answers with clear and well labelled sketches.

Comments on individual questions:

1 (a) (i) Most candidates were able to gain two marks for this part of the question.

(ii) Most candidates were able to gain at least one mark for this part of the question with nearly all candidates referring PVA as being a suitable adhesive. However, there was a significant number of candidates who erroneously gave 'super glue' as one of the answers. Better candidates were able to suggest trade names such as 'Aerolite' or referred to UV cured resins.

(iii) Most candidates scored at least three marks for this part of the question. Better candidates did not just rely on simply gluing the boards together but took into account the grain direction and how the length of the joint could be strengthened by the use of biscuits or other methods.

(b) (i) Better candidates were able to give a brief description of the frame could be constructed. The candidates augmented their answers with detailed sketches of suitable joints and how the frame could be held together whilst adhesives were curing.

(ii) A significant number of candidates failed to appreciate the natural movement of timber in furniture and decided to simple screw and dowel the top to all of the edges of the frame. Better candidates allowed for this

movement by either slotting the frame to allow for movement or included slotted metal brackets in their responses.

(c) This section was generally well answered as many candidates were able to address the implications to the designer when selecting suitable timbers. Managed woodland, grain and stability of timber being the main focus points.

2 (a) (i) Most candidates were able to give at least three reasons why aluminium alloy was a suitable material for the drinks can. However, there were a significant minority of candidates who still insisted on using such terms as 'strong' or 'cheap' in their responses.

(ii) Most candidates were able to identify at least one suitable feature of the ring pull design. The better candidates were to describe with the aid of sketches some of the ergonomic and anthropometric factors of the ring pull such as the mechanical advantage gained through the leverage. Credit was allowed for the weakened surface in the can's top as this is considered to be part of the ring pull.

(b) Most candidates were able to give an outline description of cold forming. Better candidates were able to give detailed answers augmented by sketches to aid their responses. These answers described the process from blanking the discs through to a 'lidded' can.

(c) This section was generally well answered with many candidates correctly identifying the economic implications associated with setting up a continuous production method. The better candidates expanded their answers from set up costs to the difficulties of running an inflexible manufacturing line, down time, storage difficulties as well as considering the benefits gained through lower production costs.

3 (a) (i) Most candidates were able to correctly identify at least three reasons why ABS is a suitable material for the casing of the drill. Better candidates correctly identified that the material has high impact strength, is scratch resistant and they also described the suitability in the production of the drill. It was disappointing to note the number of weaker candidates who considered 'strong' and 'cheap' as a suitable response.

(ii) Most candidates fully described at least one method of successfully joining the two halves of the casing. Weak candidates tended to give simple answers such as 'gluing it together'. Better candidates suggested techniques such as locking clips moulded into the case and machine or self tapping screws.

(b) Most candidates were able to describe the production cycle for extrusions in some detail. It was pleasing to see a large number of very well labelled sketches used to enhance candidates' answers.

(c) This section was generally well answered. Most candidates were able to identify the environmental implications of the use of rechargeable and non rechargeable batteries, their manufacture and disposal. Better candidates were able to expand their answers by giving examples of some of the heavy metals used in the manufacture of rechargeable batteries and the potential hazards involved in their disposal.

4 (a) (i) Most candidates were able to identify two suitable surface finishes.

(ii) Most candidates correctly described two reasons why the board needed an applied finish.

(iii) Generally well answered with most candidates describing the difficulty of determining the size of the print run and the potential waste.

(b) Most candidates were able to give an outline description of the offset lithography process. Better candidates were able to give very detailed answers augmented by some excellent annotated sketches to aid their responses.

(c) There were some good answers to this part of the question and the better candidates were able to discuss in detail how designers make full use of the various strategies aimed at marketing their designs. Better candidates went into details of how a market might be targeted and also considered the need of the retailer.

5 (a) (i) Most candidates were able to draw and annotate a cross section of duplex board.

(ii) Most candidates were able to give two reasons that made duplex board suitable for this product.

(iii) Most candidates were able to describe at least one method of securing the side of the box so that it was able to take the weight of the scanner.

(b) Considering this question was designed for candidates who have chosen graphics as one of their specialist areas of study the standard of graphic communication was considered to be very poor. There was a significant number of candidates who produced very poorly un-proportioned sketches that had very limited detail and little chance of success as a working net. Better candidates produced detailed, proportioned sketches with good annotation showing such things as fold lines, locking tabs, handle slots and the inner top lid.

(c) Some candidates gave very superficial answers to this part of the question. Whilst the majority of candidates correctly identified some of the environmental implications for designers there was very little reference as to why these issues are important and very few examples were given in support of the discussion. The better candidates also considered issues such as using less virgin material, reducing the amount of packaging, its safe disposal or re-use and gave supporting evidence as to why these issues are important.

6 This question was one of the least popular questions on the paper.

(a) (i) Most candidates were able name two pre-manufactured standard components.

(ii) Most candidates correctly identified three reasons why cotton velvet fabric is used.

(iii) Generally well answered with most candidates were able to produce annotated sketches to show the structure of a cut pile fabric.

(b) This part was generally well answered. However, many candidates gave only vague descriptions of the order of manufacture in their responses. The better candidates were able to correctly identify the major points involved in the manufacture and sequenced them in a logical order as well as making reference to the fact that they were working with a cut pile fabric.

(c) This section was generally poorly answered as many candidates gave very generic responses concerning environmental issues. Better candidates referred to use of pesticides in the production of cotton or if it was being produced without the use of chemicals the measures that were being taken. Others described the renewable nature of the crop and the benefits of using a sustainable crop.

7 (a) (i) Most candidates were able to give three performance characteristics.

(ii) Most candidates were able to give one reason for the use of net fabric as part of the play tent.

(iii) Generally well answered with bias binding and over-locking being the two most preferred methods.

(b) This part was generally well answered with most candidates correctly describing the order of manufacture. Although in many instances the order described was not very logical. The more able candidates were able to illustrate their answers with clear annotated sketches.

(c) There were a significant number of weak responses from candidates who only gave limited justifications to the issues they raised. The better candidates were able to give detailed design implications for textile products used outdoors. These answers included such considerations as sun-fade, wet -weather as well as breathable fabrics used in outdoor clothing.

2524/02

General Comments

(Centres should refer to the published generic mark scheme for this unit when reading this report.)

Administration

It would be helpful if all Centres would ensure the following points are carried out at the end of the examination before despatch to examiners.

- Candidates should circle the question they have answered on the first answer sheet.
- Write their name and candidate number on all four answer sheets.
- Loosely enclose the four answer sheets in the headed folded A2 sheet provided without any further method of securing answer sheets.
- Remove the question sheets.

Work of Candidates

Some good work has been seen this session from candidates who have combined sound technical knowledge with creativity and excellent communication.

For some candidates poor time management is a major problem, with final sections that are either rushed or unfinished. An important part of the preparation for the exam is to develop techniques to present ideas quickly and clearly. Examiners are aware of the pressure on candidates in this examination and marks are awarded with this in mind.

The way in which Centres use the pre-release materials can have a significant impact on the results. A few candidates misinterpret questions, either because they do not read them with sufficient care or because they choose to base their work on practiced work to a design brief based on the pre-release themes. The themes for the examination deliberately give little opportunity to prepare specification points or ideas in advance of the examination to prevent over-preparation of candidates. Centres are reminded of the specification content:

> *'The preparation for the examination should be carried out by the candidate. It is not intended that the preparatory work should be formally taught.'*

Comments on each of the marking criteria:

Specification Points (SP):

This section discriminates well between the more and less able candidates. The more successful concentrate their thinking on the functional and user needs of the product, and ensure that the relevance of all points are explained.

There is often evidence of mnemonics used to prompt candidates to cover a broad range of specification points. Unfortunately, this often leads to a list of generic specification points that cannot be awarded marks unless made relevant to the question answered through specific references to the situation and careful justification.

It is disappointing that many candidates continue to produce specification points that lack justification. It is helpful if candidates include words such as “because”, “so that” or “in order to” when writing their statements, as it prompts them to write an identifiable justification.

Initial Ideas (ID):

There is a growing, and welcome, trend among candidates to utilise some form of coding (often using colour) to distinguish types of annotation relating to the mark criteria set out for them.

Range of Ideas (R):

Most candidates produced a suitable range of ideas although for some it seemed difficult to move away from one basic concept, such that all ideas presented were essentially the same. To be awarded high marks the ideas must be *functionally different* rather than relatively superficial changes in shape or configuration. Credit is given for sketches which explore and develop possible variations within a concept. This is often an indication of the work of more able candidates who do this fluently, simultaneously gaining marks in the more technical criteria of this section.

Design Ideas relating to the functional aspect of the Specification (S):

Most candidates scored well in this section. More candidates are producing annotation which refers explicitly to the specification points of the previous section; this helps the candidate to earn high marks, by focussing their attention on the function of the product.

Quality of design thinking relating to volume production and wider market issues (V):

Although work in this section improves session on session, it remains a weak area with most annotation superficial (e.g. ‘suitable for mass production’) often unsupported by evidence in the sketches. Very few candidates address the wider market issues in any meaningful way; candidates should be encouraged to think about how their designs can meet the needs of diverse groups of consumers.

Detailed consideration of Construction (C):

This section differentiates clearly between able and less able candidates. In many cases there is little or no evidence that candidates have any understanding of how their designs could be manufactured, and in many more suggestions are clearly based on school workshop practice rather than commercial volume production.

A few candidates produced quite detailed textbook style sketches and explanations of manufacturing processes (such as injection moulding or extrusion) as construction methods used to produce *components* rather than information about how the *product* would be constructed. This should be discouraged as it does not meet the needs of the mark scheme.

Consideration of specific Materials and Components (M):

As above, the technical knowledge required for this section often differentiates between able and less able candidates. Most candidates now remember to suggest materials for construction and very few continue to use generic terms such as ‘wood’, ‘plastic’ or ‘card’. Unfortunately, in too

many cases the materials are unsuitable for the product and its application, and rarely is the choice of material justified by explaining a property that is relevant to the product and its application.

Consideration of Dimensional detail (D):

As in previous sessions there was much evidence of candidates simply taking dimensions given in the question (for example the dimensions of a laptop and projector in question 2 or a dvd case in question 3) and applying these to their sketches. Whilst this is a reasonable starting point for indicating the scale of a product it is important that candidates understand that much more detail than this is required for full marks. Dimensions of individual features, components and/or thicknesses of materials are needed to score well in this section.

Evaluation of the suitability of the ideas with reference to the specification (E):

A lot of annotation for this section was purely descriptive and showed no real evaluation at all. Some only focussed on the positive aspects of their ideas, with no reference to possible problems or improvements. Some used an “evaluation of ideas table” which can be successful if completed with evaluative comments. However, candidates should not use such a table with simple ticks, crosses or numbers which do not really show the depth of thought required at this level. More able candidates were able to offer objective evaluation against all of their specification points.

Features suitable for development (FD):

Appropriate features identified and clearly described (F):

A wide range of techniques is acceptable for this section, and most candidates responded in an appropriate way. The majority used sketches, which is the preferred method (although text alone is acceptable), to identify a number of features from their initial ideas. Some feel the need to make changes or to develop the features from the ideas section although this is not expected and is certainly not necessary to gain full marks.

Appropriate Justification of the choices made (J):

Several candidates went into a lot of detail in this section. This detail would have been better suited to the previous (ID) section where it would have received more marks. In some cases it was clear that the candidate did have the relevant knowledge and understanding that they were required to demonstrate in their initial ideas. Unfortunately by placing this information (and sometimes very detailed evaluative commentary), in the wrong section, they gained nothing.

Communication skills and techniques (CS):

Examiners are mindful of the time available to complete this paper and the quality of work produced by more able candidates in this area is truly impressive. An extremely wide range of work is seen; in terms of graphical techniques better examples include different drawing styles (such as sections, cut-aways and hidden detail to show construction and functionality) as well as the more obvious 3D sketches. In terms of annotation; logical layout, clear reference to the marking criteria, detail and legibility are all evident.

There appears to be a trend toward increased use of quite lengthy passages of text to explain designs rather than simple, but detailed, sketches which used correctly could provide the necessary information more clearly, concisely and quickly. In some cases, handwriting and use of grammar has been so poor that it is difficult to understand and/or interpret the thinking expressed.

Comments on Individual questions:

Questions one, two and four proved the most popular.

Question One: Aid for teaching young children to tell the time:

This popular question was not always answered well, with many candidates struggling to find a range of significantly different ideas. As the product was intended for use by children there were many references to safety but few ventured beyond the superficial 'no sharp edges' or 'no small parts that could be swallowed'. Some candidates designed novelty clocks with little or no reference to the design requirements.

Question Two: Use of laptop and projector by a speaker:

The wording of this question allowed candidates to interpret it in a number of ways – as a carry case for the items, as a stand for use during the presentation or a combination of these two functions. All were acceptable. This allowed consideration of both functional and aesthetic design requirements which more able candidates were able to explore.

Question Three: Point of sale display for DVD of the week:

The majority of candidates answering this question responded well to the functional requirements of the display (clarity, accessibility, stability etc) yet struggled to produce a range of different viable solutions.

Question Four: Storage of kitchen utensils:

This was the most popular question and was answered quite well by many candidates. In some cases the range of ideas did not extend far beyond familiar commercially available products but most included appropriate suggestions for materials, construction and dimensions.

Question Five: Free gift for an environmentally themed magazine:

It was disappointing that this question, which invited a wide range of responses, was answered by relatively few candidates. Most responses were based on typical free gifts, for example hats, t-shirts, wall charts etc, often with very superficial technical details of construction or manufacture.

2525/01 Systems & Control Technology

General Comments

The majority of candidates who sat this paper opted to do questions 3 & 4. Only 16% of candidates attempted the pneumatics questions (5&6) and 27% the electronics (1 &2). It is evident that Centres tend to specialise in one of the three areas.

Many candidates had problems with questions containing calculations. Using the calculator does not seem to be a problem, but understanding how to tackle the problem and application of formula caused many lost marks. At this level and with a formula sheet candidates should be able to tackle the calculations required of them.

The 'discuss' part of each question was answered a lot more fully than previously.

Comments on Individual Questions

1a)	i)	The majority of candidates answered this question correctly.
	ii)	Most candidates successfully calculated the answer to this question.
1b)	i)	Only a few candidates identified terminal S as the SET.
	ii)	Candidate's responses varied greatly. Only a limited number identified the exact sequence of events in the process.
1c)	i)	The majority of candidates gained some of the credit for this question, however very few clearly comprehended the correct trigger for a 555 or correct value for components.
	ii)	Few candidates gained full credit for this question. Many failed to link it to the original circuit (fig1). Many attempted to include a decade timer.
1d)		Generally candidates gave a clear account of the implications of high price energy. A number failed to comprehend the implication to the customer and focused purely on the manufacturer.
2a)	i)	Most candidates answered this question correctly.
	ii)	The majority of candidates produced a valid truth table.
	iii)	Few candidates produced a complete answer. Candidates tended correctly identify only one pair of gates, usually as a result of an incorrect truth table in (ii).
2b)	i)	Candidates in general answered this question correctly.
	ii)	Responses to this question were very inconsistent.
2c)	i)	Candidates recognised that the source enabled the gate to act as a current supply, however very few candidates identified the relevance of the output from the gate being high.
	ii)	The majority of candidates produced a solution using either a transistor or MOSFET. Very few included a free-wheeling diode and many put the LED/resistor and buzzer in series rather than parallel.
2d)	i)	Very few candidates demonstrated an understanding of the manufacture of SMT. Generally this question was poorly answered.
	ii)	Most candidates comprehended that the use of SMT resulted in smaller products.

2e)		Candidates in general gave a valid response to this question.
3a)	i)	The majority of students answered this question correctly.
	ii)	Most candidates correctly identified the difference in strength and hardness.
	iii)	Responses to this question were very inconsistent. Many candidates straying away from the factor of safety of the cable.
3b)	i)	Most candidates answered this question successfully.
	ii)	The majority of candidates answered this correctly.
	iii)	Candidates correctly identified a suitable material for the other gears.
	iv)	Most candidates gave a valid reason for the use of different materials.
	v)	The majority of candidates answered this correctly, suggesting drum lock or 908 change in drive direction.
3c)		Many candidates successfully calculated the answer correctly. Few however gave a clear account of how they reached the answer.
3d)		The majority of candidates made a valid attempt at this question. Some became side tracked focusing purely on global warming.
4a)	i)	Very mixed response to this question with only a limited number of candidates making reference to the transmission of forces.
	ii)	Few candidates gave a coherent explanation of pitch and lead, many endeavouring to make an explanation of (fig6).
	iii)	Very few candidates comprehended a correct advantage of a multi-start thread.
4b)	i)	A mixed response to this question, a number of students failing to apply the formula correctly.
4c)		The majority of candidates answered this correctly.
4d)	i)	A number of candidates failed to recognise the question focused on a 'destructive' test, none appeared familiar with the industrial/ technical names. The majority identified compressive or stress tests.
	ii)	Many candidates produced a destructive tensile or compressive test with appropriate annotation. A number of candidates reproduced test rigs from the Product Study unit.
	iii)	Candidates in general gave a valid explanation of the test; few extended this to explain how the test achieves its purpose.
4e)		Candidates in general gave valid answers. A number of candidates became side tracked focusing on identity theft and ecommerce.
5a)	i)	Most candidates answered this correctly.
	ii)	Candidates correctly identified restricting the exhaust gives a smoother movement; few extended this to include the result of restricting the air flow.
	iii)	Very few candidates produced an appropriate graph/ axis for this question.
	iv)	Candidates gave a mixed response to this question. Many identifying the pressure as high.
	v)	Many candidates gave an identified the appropriate components and detection methods. However many failed to gain full credit as the circuited were incorrectly drawn.

5b)	i)	Many candidates correctly calculated this question, some candidates however confused units, thus failed to gain full credit.
	ii)	Very few candidates answered this question in enough detail to gain full credit. Many focusing only on the in-stroke piston rod diameter.
5c)		Candidates generally gave a good account for this question, recognising economic and environmental implications.
6a)	i)	The majority of candidates correctly answered this question.
	ii)	Most candidates calculated this correctly (or within tolerance).
	iii)	Candidates who successfully answered (ii) correctly calculated the answer. A number left the answer in minutes/ seconds.
	iv)	Candidates gave a mixed response to this question, a number focusing on stresses imposed on the test rig.
6b)	i)	Most candidates correctly identified the advantage of double acting cylinders in this application.
	ii)	Very varied responses to this question with many candidates correctly identifying components and actuators, but failing to include the correct interconnections.
6c)		Few candidates calculated this correctly.
6d)	i)	Surprising few candidates gave a valid response to this question.
	ii)	Many candidates failed to comprehend factor of safety in the context of the question.
6e)		Candidates answered this question well, clearly comprehending the benefits of the use of prototypes.

2525/02 Systems & Control Technology

General Comments

Overall candidates responded a lot better in this section of the examination.

66% of candidates elected to tackle question one, 19% question two and the remainder attempted question three.

Once again, Centres are asked to encourage the small but significant number of candidates who are not circling the question number they are answering or putting their name at the bottom of each sheet to do so.

There still appear to be some Centres that are not giving guidance to their candidates on how to answer and manage their time for these types of questions. The pre release materials should be used as a guide for candidates to do some preliminary research into the chosen areas.

Specification

Candidates must ensure that the points offered do 'directly relate to the given situation'. All too often, candidates fail to gain marks in this section because comments are generic or a statement is not fully justified. A small number of candidates either added additional specification points or tried to put more than one point in an answer.

Once again It is suggested that candidates avoid points related to cheapness / price, aesthetics and green issues because some of the situations posed will make these points difficult to relate directly to the given situation and even more difficult to justify.

Initial Ideas

It was pleasing to see candidates offering a reasonable range of alternative ideas and, more significantly, these ideas further developed with circuit diagrams, flow charts, exploded views and detail drawings. This approach allows candidates to access the full range of marks provided their sketches are suitably annotated. One Centre in particular had taught candidates to use coloured markers to highlight each area of the marking scheme they had covered in their annotations. This helped with the marking, provided the highlighting was accurate, and must have helped candidates during the examination.

When evaluating their ideas candidates must ensure it is referenced to the specification and that the evaluation and the specification must agree. Putting specification points as numbers in circles, underlining specification statements or using a highlighter are just three ways to ensure evaluation statements and the specification points are linked.

If candidates practise doing this section of the paper they will develop their own style of presentation that suits them but still allows them to access the full range of marks. This section contains 66% of the marks.

Features suitable for development

Most candidates offered something in this section. Those who performed well offered a range of features from their initial ideas that were suitable for development and justified them all against

the specification. The features selected by candidates should cover the majority of the design, be realistic and have sufficient detail drawn or explained.

Candidates need to remember that repeating the specification is not what is required but rather an intellectual justification of the points chosen.

Efficient Communication

To gain the highest marks in this area candidates are expected to show fluent design thinking through a **range** of graphical presentation techniques so that it can easily be followed and understood by a third party. Those candidates who offered a small, single overall diagram for each of two or three ideas did not score highly in this section.

Grade Thresholds

Advanced GCE Design and Technology (7822, 7823)
Advanced Subsidiary GCE Design and Technology (3822, 3823)
June 2009 Assessment Series

Unit Threshold Marks

Unit		Maximum Mark	A	B	C	D	E	U
2518	Raw	90	68	60	52	44	37	0
	UMS	90	72	63	54	45	36	
2519	Raw	120	96	84	72	60	48	0
	UMS	120	96	84	72	60	48	
2520	Raw	90	61	54	48	42	36	0
	UMS	90	72	63	54	45	36	
2521	Raw	90	60	53	46	39	32	0
	UMS	90	72	63	54	45	36	
2522	Raw	90	70	62	55	48	41	0
	UMS	90	72	63	54	45	36	
2523	Raw	90	71	63	55	48	41	0
	UMS	90	72	63	54	45	36	
2524	Raw	120	76	69	62	55	49	0
	UMS	120	96	84	72	60	48	
2525	Raw	120	77	70	63	56	50	0
	UMS	120	96	84	72	60	48	

Specification Aggregation Results

Overall threshold marks in UMS (ie after conversion of raw marks to uniform marks)

	Maximum Mark	A	B	C	D	E	U
3822, 3823	300	240	210	180	150	120	0
7822, 7823	600	480	420	360	300	240	0

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

	A	B	C	D	E	U	Total Number of Candidates
3822	18.7	42.1	70.2	89.4	98.1	100	532
3823	8.3	25.0	41.7	72.2	94.4	100	36

532 candidates aggregated this series for 3822

36 candidates aggregated this series for 3823

	A	B	C	D	E	U	Total Number of Candidates
7822	18.1	41.7	67.1	87.7	97.4	100	2468
7823	27.8	51.9	74.4	88.0	99.2	100	136

2468 candidates aggregated this series for 7822

136 candidates aggregated this series for 7823

For a description of how UMS marks are calculated see;
http://www.ocr.org.uk/examsystem/understand_ums.html

Statistics are correct at the time of publication

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1 Hills Road
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