

Design & Technology

Advanced GCE **A2 7822-3**

Advanced Subsidiary GCE **AS 3822-3**

Report on the Units

January 2009

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

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This report on the Examination provides information on the performance of candidates which it is hoped will be useful to teachers in their preparation of candidates for future examinations. It is intended to be constructive and informative and to promote better understanding of the syllabus content, of the operation of the scheme of assessment and of the application of assessment criteria.

Reports should be read in conjunction with the published question papers and mark schemes for the Examination.

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Chief Examiner's Report

General comments

Centres should be aware that there is now only one more opportunity to enter the OCR Legacy AS Level qualification in Design and Technology.

June 2009 will be the last opportunity to enter 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

It is expected that the majority of entries for the AS specification in June will be for re-submitted candidates. Centres are requested to check with their Examinations Officers to ensure that the correct specification has been entered.

Re-submitted candidates and Centres who wish to take the old legacy AS qualification for the last time should ensure that candidates are prepared to the correct specification:

Advanced Subsidiary GCE AS 3822/3823
THIRD EDITION

The old legacy A level specification has one more substantive entry in June 2009. This is for the group of candidates who were prepared for the AS specification above. There will be two further opportunities for candidates to resit the old legacy A level Units; in January 2010 and for the last time in June 2010. It is not intended that the old legacy specification will be available after this date.

Candidates who are entered for A level in June or for the two subsequent re-sit opportunities should be prepared and entered for the correct specification:

Advanced GCE A 7822/7823
THIRD EDITION

It is essential that Centres check with their examinations office to ensure that they have entered all candidates prepared for the new AS specification for June 2009 under the correct specification code:

AS/level GCE Design and Technology: Product Design
Advanced Subsidiary GCE H053 For first award of AS level in summer 2009

A level GCE Design and Technology: Product Design – (For the above candidates)
Advanced GCE H453 For first award of A level in Summer 2010

The following report should be used to inform the preparation of candidates for the last entries of the old legacy specification.

2519 Product Study (Coursework)

General Comments

The January session is typically regarded as an opportunity to re-submit the work of individual candidates who wish to build on their previous performance. A small number of Centres enter larger groups following a Results Enquiry. A few Centres have always used the January session for their substantive A Level entry. This is the last January session available for the Legacy AS Level Product Study and it was assumed that it would be used predominantly for re-submitted candidates. The pattern of entry however reflected that of previous years, with a mixture of candidates from the categories mentioned.

Centres should now be aware that there is now only one more opportunity to enter Unit 2519 - This is for the June 2009 session. This can be for candidates who are resubmitting or for the very last cohort of candidates from Centres who wish to enter the Legacy AS level for the first (and last) time. Centres who wish to do this should note that, for this very last session, there will be no re-sit opportunity.

It was not anticipated that there would be a very large entry for the June 2009 AS Legacy specification. It is evident that some Centres have 'rolled over' a similar number of candidates as previous years. Centres are requested to check with their Examinations Officers to ensure entries made reflect the specification that candidates are being prepared for.

From September 2008 a new Unit F522 became available. It is inevitable that in some Centres both specifications will be running in parallel. The requirements for each Unit, although based on the same overall ethos, are different. It is essential that Centres prepare candidates for the appropriate specification and address the required assessment criteria. The report which follows will give detailed advice by section on the requirements for re-submissions for Unit 2519 only. A summary will then identify the main requirements of the old specification and highlight the main characteristics of the New Unit which it is anticipated the majority of candidates will be entered for in May 2009.

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 our 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 submissions for Unit 2519 in May 2009.
This is the last time candidates will be prepared 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) (2x 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:

There is now a requirement to consider the moral implications associated with economic issues. (Not 'economical' issues!)

This section has a new direction and is being misinterpreted by many candidates. The clear emphasis is now on the **moral implications** associated with three specific issues. Centres need to prepare candidates for this by organising and structuring **ethical debates** about the environment, social cultures and economic issues. The term 'economical issues' should be avoided as it encourages a discussion of general cost issues, which is not what is intended. A far wider debate about the effects of the global economy and exploitation of workers is required. This section is very poor in many cases and large reductions are being made by moderators. Marks in the top band are not awarded in many cases. For any candidates re-submitting an ethical debate about economic issues is essential. Clear advice and structured teaching is required. 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." "Briefs have been invariably anything but, with suggestions hidden amongst notes."

- **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.

- **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)**

All moderators report an improvement in responses to this section with some outstanding responses from the better candidates. Those candidates who re-submit their work need to be aware that they need to produce a range of both 2D and 3D models in this section, and marks in the highest band cannot be justified where no evidence of 2D modelling is presented. This section is where moderators apply the greatest scaling to Centre marks.

"We still have Centres doing a 'final prototype' which usually means not many models."

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 bread boarding techniques can all precede the use of more resistant materials in the development of 3D models. Folders should not contain any 3D material.

- **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.

Summary of some main points for re-submitting Unit 2519 in May 2009:

Specification is clearly labelled Design and Technology AS 3822/3823 unit 2519 For first AS assessment June 2005. THIRD EDITION

- Make sure Version 3 of the specification is being used.
- **All resubmitted work should be clearly identified with applied annotations.**
- Choose one specific, single, selected product- show it being used.
- Show evidence of comparative products actually being used- write a summary, which relates back to the single selected product.
- Emphasise the moral implications of economic issues- engage in an ethical debate.
- The brief should clearly identify one improvement to the single selected product.
- Specifications should be detailed and justified.
- Ideas must be creative, annotated and lead towards an idea, which is justified for further development. (Design ideas suffer through lack of innovation and development)
- Design constraints on the selected idea must be considered- an image of the product makes this section far more relevant.
- Make a range of both 2D and 3D models. (Use a variety of materials for models do not rely on one material)
- For 2519 - **All** candidates **must** construct a test rig using workshop tools. Don't share!
- No marks are awarded for details of how a test rig was designed and made.
- Test results, evaluation of modelling and a further improvement should all feature in the summary section.
- Centres: Be rigorous and consistent in awarding no marks (0) where no work is presented against the assessment criteria.
- Please maintain the improvement in the quality of photographic evidence.
- All 2519 projects should be presented on A3 paper in no more than 20 sheets
- Bind project securely down the left-hand side.
- Do not use plastic sleeves or folders of any description.
- Candidate name and number and Centre name and number should all appear on the front cover.

Summary of Main features of Unit F522 for teaching from September 2008 for first Moderation May 2009.

Details of the new specification are clearly labelled Design and Technology: Product Design Advanced Subsidiary GCE H053 Unit F522. For first award in summer 2009.

- **Products can be selected from any of 8 different focus areas:**
- **Built Environment and construction, Engineering, Food, Graphic Products, Manufacturing, Resistant Materials, Systems and Control, Textiles.**
- Work can be presented on 20 sheets of A3 paper or CD ROM equivalent to current OCR approved standard. (currently PP)
- Please consult the OCR guidance booklet for submitting E-Portfolios. In particular guidance on 'Pack and Go' for PowerPoint.

Report on the Units taken in January 2009

- For the Product Study please do not over enhance backgrounds, please use Arial font at least 10pt.
- If video clips are used: 3-5 of no more than 20 sec. each would be appropriate. - Make sure they work from an individual CD on an independent stand-alone laptop.
- A candidate must submit either an A3 paper folder **or** an individual CD **not** both.
- A Centre can submit some candidates work as A3 paper folders and some as CD's.
- Centre and candidate name and number must be on all paper and individual CD's.
- CD's must have full details on both the outside cover and written on the actual CD.
- Work must be recorded in real time and digital technologies must be used.
- A 'real time' digital image of the product in use will be an essential feature.
- The ethos of the Unit remains the same: A single specific named product is selected and shown in use- a detailed description of the product is given together with needs of manufacturer and consumer. Key criteria are identified.
- There are sections on Strengths and Weaknesses comparison, Moral Implications, Brief and Specification.
- The ideas section and modelling are now linked in a new section called 'Design Development'. The approach to this section will differ depending on the focus area studied by the candidate. The key thing is that the development is appropriate to the product and the focus area.
- There will no longer be a requirement to consider 'Design constraints'
- The requirement to make a test rig is no longer necessary this has been replaced with the need to plan and implement an appropriate test on the final developed idea.
- If some Centres have grown to consider the test rig with great affection and bemoan its passing it will still be possible to submit one if it is considered an appropriate test!
- The summary of results section remains.
- Communication skills now include the use of digital technology, and interactive dialogue.

It is essential that these two specifications are kept entirely separate. Candidates re-submitting Unit 2519 must include all requirements to fulfil the assessment criteria. In particular, Design Constraints must be considered and an individual Test Rig must be manufactured with workshop tools. 2519 is an A3 paper based qualification. Those Centres preparing candidates using digital technology -in particular video clips should ensure they have entered Unit F522 in the new specification.

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

General Comments

There was an even spread of responses to questions, with questions 1, 3 and 5 marginally the most popular.

There were a number of candidates who attempted all 5 questions. Candidates employing this strategy did not access the higher range of marks. Their answers tended to be very brief and lacked the required detail.

Candidates should be reminded to read through the paper carefully and select three questions to answer, making sure that all of the questions have been read, not just part (a).

A significant number of candidates misread or misinterpreted questions. Q2 (a), Q3(c) and Q4 (b). (See comments on individual questions).

A significant number of candidates attempting Q5 did not turn over to the last page and failed to answer part (d).

Many candidates did not give justified design requirements in answer to part (a) of the questions. Generic statements do not receive credit; the design requirement must focus on the given product.

Candidates should be reminded to look at the key requirements of questions. Candidates who underlined or highlighted key words in the question tended to focus their answers and respond appropriately.

The product given at the start of the question gives a direct focus for part (a) only. If reference to the product were required in subsequent parts of the question, an explicit instruction would be given e.g. Q3 (b) '...the chair shown in Fig.2..'

Candidates can make reference to the product to respond to subsequent parts of the question if appropriate.

Whilst most candidates have a clear understanding of the exam format and requirements, a number produced very brief responses and did not use the full allocation of space provided to answer. This was particularly evident in the discuss questions. A significant number of candidates focused on one point or issue, and some produced a series of bullet points. They had not complied with the instruction 'to discuss' and did not access the higher marks range. There was a significant improvement in the inclusion of relevant examples or evidence to support answers. In some cases candidates spent too long describing the example e.g. in Q1 (d) focussing too long on a specific example of a product demonstrating a technological development.

Comments on Individual Questions

- 1
 - (a) Many candidates responded correctly with justified design requirements such as 'have a stable base to avoid tipping over' and 'have easy access to connect additional devices.'
 - (b) A large number of candidates focussed on functional requirements of a flat screen television and did not include reference to the user to describe ergonomic features. Almost all candidates described the positioning and ease of use of the on/off control.
 - (c) Generally well answered with most candidates referring to the range of models available, the rapid changes in technology and customer demand for newer products.
 - (d) Whilst there were a number of outstanding, full responses to this part, some candidates focussed on one issue, usually customer desire for latest developments. Whilst almost all candidates made reference to an appropriate example to support their answer, some focussed too much on the technical features of the product given as an example
- 2
 - (a) Generally well answered, with most candidates were able to give at least two ways in which manufacturers of products could reduce energy consumption. Some candidates focussed on environmental issues such as using alternative energy sources, which would not cut consumption.
 - (b) Many excellent responses were given to this question. HEP was described well by the majority of candidates; tidal and wave power was not described as well in most cases.
 - (c) Generally well answered, many candidates achieved high marks. Most focussed on issues such as pollution and increased road usage. Some candidates referred to the benefits of the increase in the availability of products on a national and global scale.
- 3
 - (a) Well answered overall, although a number of candidates gave generic or simplistic statements related to a chair and not the specific type of chair, which was to be used in the reception area of a luxury hotel.
 - (b) The question required candidates to refer to the chair shown in Fig.2 and give reasons why it would be suitable for high volume production. The majority of candidates were able to give correct responses relating to a basic design with no complex features, the minimal number of parts and the low number of manufacturing procedures required.
 - (c) Many candidates were able to describe factors such as the target market and the placement and cost of advertising methods. A significant number referred to features of the chair and not factors relating to advertising.
 - (d) There were some very good, well-reasoned responses to this question, with candidates raising issues relating to the simplicity of designs and their success in terms of function and in the market place. Some candidates focussed solely on what constitutes a simple product and did not achieve the full range of marks available.

- 4
- (a) Generally well answered with justified requirements relating to the specific ergonomic requirements of the strap; the robust construction and ease of use required for a product to be used by a primary school pupil and the functional requirements of enclosing shoes.
 - (b) Very few candidates were able to give three quality control checks to be carried out in the manufacture of a drawstring bag. Many made reference to tests for the suitability of materials, which would be carried out before manufacture. The best responses included visual checks for colour / print accuracy, sample checks on stitch quality and sample checks on attachment systems e.g. drawstring movement.
 - (c) Very well answered with a number of candidates achieving maximum marks. There were a number of very innovative responses amongst the range of local promotional schemes proposed. The most common answers included promotions through school newsletters and website and rewards for successful students.
 - (d) There were many very good answers to this question. Most candidates had a clear understanding of the use of bought-in parts and were able to raise issues such as: time cost benefits, choice of and reliability of suppliers. A number did not include a relevant example or include supporting evidence.
- 5
- (a) Generally well answered. The most common requirements focussed on: specific ergonomic features relating to the shape of and the pressure required to press the top; the ease of refilling staples and a non slip base that would not damage a surface.
 - (b) Well answered with most candidates focussed on simplifying the design of the stapler to keep manufacturing costs low by reducing unnecessary features; using standard or bought-in components and by the selecting cost effective materials.
 - (c) Many candidates focussed on the quality control during the manufacture of a product and made little further reference to ways of assessing the quality of the product. The best response included wider user testing and feedback and independent review.
 - (d) A number of candidates attempting Q5 missed this part of the question. Whilst many candidates referred to the cost implications of introducing a Research and Development department and the benefits of developing new products and making best use of materials and manufacturing processes, a significant number referred only to the marketing research issues of investigating user trends and keeping an eye on competitors.

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.

Given the timing of this examination candidates have performed at the expected level.

Part 'b' continues to be an area which requires further work by Centres; many candidates lacked the depth of the knowledge to answer this question effectively.

Comments on Individual Questions

Q3 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 name at least one thermoplastic, acrylic and PVC were common misconceptions.
- (b) Some very good responses to this question, candidates demonstrate a good understanding of the whole process with many gaining full marks in this section, however some missed obvious marks by forgetting to mention 'split moulds' and 'removing the flash'.
- (c) This question was a clear discriminator, many used the CE mark as an example and many used the slide and its parts as useful examples to highlight the question. Many candidates repeated themselves within this question, however there were also some very interesting answers given by the stronger candidates.

Q1

- (a) (i) Very well answered by the majority of candidates.
(ii) Again generally well answered, however some candidates were looking for more complex answers within this question.
- (b) Very few candidates scored full marks in this section with a tendency to concentrate on the development of the product using CAD; they are clearly used to using this type of software, and in some cases failed to make the link between the two areas in the question. The discussion related to CAM was, as a consequence generally superficial (with a few exceptions).
- (c) Generally well answered by most candidates, clearly available to all, candidates enthusiastically discussed this question and many were awarded full marks within this section.

Q2

- (a) (i) Generally well answered although full marks were not always achieved by all candidates. (ii) Again generally well answered, most candidates were away of the properties of aluminium.
- (b) It was good to see an increase in candidates knowledge within this section this year, some very good answers were given, however many candidates let themselves down without thinking the 'whole' process through from start to finish e.g. Cutting stock to length and Finishing the bar – Two easy marks left out by the majority.
- (c) Generally okay, although many candidates stated the obvious points but they were unable to develop this into a complete answer as well as stating a relevant example.

Q5

- (a)** (i) Few candidates gave two correct responses, a significant number cited 'wood' and 'timber' as appropriate materials. (ii) The answers given within this section were linked directly to (i)
- (b)** It is clear that non graphic specialists attempted this question. It was generally poorly answered with a very basic overview of the screen printing process, candidates failed to adequately identify the production of the screen as well as very simple points like waiting for the ink to dry before applying another colour.
- (c)** Again clearly available to the majority of candidates who focused on the use of software, the speed and quality of production, few candidates discussed the need for design capability within this question.

Q4

- (a)** (i) Generally well answered, most candidates stated the environment and the possible lower cost. (ii) There seemed to be a lack of knowledge within this question and very few identified an appropriate process.
- (b)** Answers to this question suffered from lack of detail, it was clear that many candidates had used a similar process in the school workshop however they did not break the process down into relevant steps to answer the question e.g. removing excess vinyl, picking out waste vinyl from letters, applying application tape, lining up vinyl etc.
- (c)** Poorly answered by the majority of candidates who failed to grasp the requirements of the question, many mis-understood the question and did not develop any relevant issues.

Q6 - Very few candidates answered this question, when answered it was answered by whole Centres.

- (a)** (i)(ii) Generally well answered by all candidates, full marks were awarded in most cases.
- (b)** The majority of candidates were aware of the process, but again like many other section b questions these responses lacked sufficient detail to warrant full marks, with simple points missed such as placing the transfer paper in the correct position, etc.
- (c)** An accessible question for the majority of candidates who attempted it, some very interesting answers with many gaining full credit.

Q7

- (a)** (i)(ii) Generally well answered by the few candidates who attempted this question.
- (b)** Again insufficient detail was provided by the candidates when answering the question, many demonstrate an understanding of the process but many failed to explain the whole process sufficiently.
- (c)** Generally well answered by the majority of candidates.

2521/02 Systems and Control

General comments

The January 2009 examination in this unit was generally answered well by the majority of the candidates. The 'discuss' section of each question was less well-organised than has been seen in the recent past with evidence of some rushed answers. However, there were good points made by the majority to gain the intended marks. Some candidates are still using points that had no relevance to the question at all. There were still specific weaknesses in the candidate's knowledge of the technical content parts of all the questions. This part of the question has always been the main discriminator between the best candidates and those who still write down something that has a tenuous link to the content of the question. The answers to this part of each question in the paper are specific so generalised answers are never going to gain full marks. This problem has been highlighted in the last five reports and again it was seen this session. However, on the positive side some candidates again produced interesting and pleasingly correct answers to the 'notes and sketches' parts of the questions. The sketches need to have enough quality of visual communication to make clear the knowledge and understanding being used in the answer. The questions with calculations in them again proved that there are still problems with the understanding of which formulae to use, even when given on the insert. However candidates who did select correct formulae made a good job of the calculation this time.

The electronics questions were the most popular this time, which turned the May 2008 order round significantly. Pneumatics questions were the next popular. However, it was pleasing to see some excellent answers from the best candidates.

Comments on individual questions

- 1(a) (i) well answered
- (ii) well answered
- (b) (i) most candidates answered this accurately
- (ii) some chose the wrong formula but those who did not scored good marks
- (c) (i) answered well by the majority.
- (ii) some good answers here but a lot of errors seen.
- (d) some good points here when candidates stayed relevant.

- 2 (a) (i) well answered.
- (ii) well answered

- (b) (i) well answered by most but often rushed responses were seen that could have been correct with more thought.
- (ii) well answered.
- (c) (i) there was a problem with general answers here which could have gained better marks by a specific description of the out put changes.
- (ii) well answered.
- (iii) well answered or completely wrong

- (d) some good points seen but many wandered away from the manufacturer and went more to the consumer.

Report on the Units taken in January 2009

- 3(a) well answered.
- (b) there were few working industrial setting clamping methods seen, often rather badly drawn bench vices.
- (c) well answered by the best candidates.
- (d)(i)(ii) quite well answered and understood but knowledge of the relative strength of types of fixings against the load was poor.
- (e) well answered and understood
- 4(a) well answered.
- (b) well answered.
- (c) (i) well answered
(ii) where justified usually correct
(iii) well answered.
- (d) well answered again when clear sketches were used.
- (e) good points seen but sometimes repeated as qualifications instead of better thought out reasons.
- 5(a) well answered
- (b) (i) often not specific answers for large air receivers
(ii) well answered.
(iii) again non specific answers used here.
- (c) often candidates did not sketch accurately enough for us to check the performance of their choices. Some good answers were seen.
- (d) marks were lost by candidates who did not keep to Food industry issues.
- 6(a) well answered
- (b) (i) some good drawings seen but the majority had a poor idea of how to use fittings.
(ii) surprisingly few correct answers here.
(iii) most candidates did this correctly with some drawing the restrictors alongside the circuit but not in it.
(iv) poorly answered by many. Formula was used but calculation and units let them down.
- (e) not much knowledge of quality assurance and often confused with quality control.

2522 Designing & Unit 2523 Making and Evaluating

General Comments

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.

There was only a small entry, the vast majority for Unit 2522. A small number of candidates resubmitted coursework folders from the June 2008 session.

A 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. Some large and complex projects resulted in superficial design work and expensive practical outcomes. A2 coursework needs to be substantial and rigorous, but it can easily be unrealistic and unmanageable. High marks were achieved in some cases from relatively straightforward problems addressed thoroughly with attention to detail.

A high standard of design and making work was presented by many candidates, and such work is an inspiration to moderate. A number of projects were innovative in concept and outcome, and creative work of this nature was appropriately rewarded by Centres.

In the majority of cases, Centres' assessments were realistic. A number of Centres' marks were lenient and just outside the tolerance permitted. Centres are reminded that although marks for individual sections may be one mark lenient, if this applies to several sections there will be a cumulative effect which will necessitate adjustments.

Reference to industrial issues was generally weak, with few candidates exploring the commercial aspects of manufacture and the implications for design in significant detail. The wider context for the product and its potential in the marketplace should be considered from the start.

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:

- e-portfolios are 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.
- 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.

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- In some cases, videos in the PowerPoint presentations would not run when 'clicked'. 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*' clearly at the appropriate place.
- 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.
- Large file sizes can be a problem. The PowerPoint files of some candidates took 10 minutes to open and settle on the PC before Moderation could begin.

These points should be noted by Centres intending to submit e-portfolios in future sessions.

Unit 2522 Designing

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. Simply copying and pasting the assessment criteria from the specification and adding a series of dates is insufficient to achieve a mark.

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)

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.

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.

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.

Candidates who earned the highest marks had personally examined existing products and solutions, and had included diagrams and sketches of existing 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.

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 points which would apply to any product and which were insufficient to guide and influence the design work.

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)

There was a wide variation in the standard of work in this section, but Centres' assessments were generally in line with the OCR standard.

Moderators were pleased to see 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.

Most candidates showed a reasonable range of initial, concept ideas but then were let down by not showing a true progression of ideas explaining and justifying a final proposal.

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 going 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)

On the whole, this section was marked fairly by Centres.

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.

Some 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.

Models that focused on specific details of the solution were generally found to be more useful than models of the final idea. Centres and candidates are encouraged to use 2D and 3D modelling as a means of testing out the viability of aspects of the design.

Photographic evidence was of variable quality, with blurred images in some folders.

Overall, some excellent and purposeful modelling was seen in this section, although not all candidates benefitted from careful and systematic evaluation of the models to inform the design development.

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

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

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.

Candidates are encouraged to follow the approach of professional designers, who evaluate their design ideas and proposed solutions through contact with their client or target market. This is likely to provide the most helpful feedback into the design development and achieve the most suitable final outcome.

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)

Moderators were pleased to note a marked improvement in this section, with candidates directing their responses more directly to the requirements for assessment.

Most candidates focussed directly on their particular designed product and explained and justified in detail the design decisions they had made. However, in some cases there was limited reference to the contents of Sections 1.5 and 1.6 of this Unit. Careful and perceptive consideration of all relevant constraints and their influence on the chosen solution is required for marks in the top band.

Assessments by Centres were broadly in line with the OCR standard.

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)

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

Whilst some responses were to a high standard of detail and complexity, CAD drawings were 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.

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 lists and notes to their working drawings to ensure all information is incorporated.

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. 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.

Unit 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.

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 tended to be 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. 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.

Centres tended to over-reward candidates' work this section.

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

A range of products were submitted. Some were extremely well constructed and finished. It was clear from candidates' records of making that they had been very particular and careful in applying a range of appropriate techniques.

'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.

The marking of this section was often lenient when compared with the OCR standard.

1.2c INNOVATION. Demonstrate innovation (12 marks)

Many candidates had explored and incorporated innovative features into their designing and making. In the majority of cases, the Moderator was in broad agreement with the Centre's assessments.

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 important to support the Centre mark.

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.

2 TESTING and EVALUATION (21 MARKS)

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)

Some candidates reported their personal observations and thoughts against the specification points but did not provide evidence of first hand testing the product in use. 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.

Some candidates did not formally focus on their Design Specification points from Unit 2522, and their comments on the strengths and weaknesses of their final solution were consequently subjective. 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.

Centres' assessments in this section were generally 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)

Most candidates obtained some form of independent evaluation and responded to the comments received.

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 do not merit top marks.

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)

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

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.

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)

Many candidates were unable to show how the design of their prototype would need to be modified for commercial production. Lengthy text was common, whilst few meaningful drawn design modifications were apparent.

An honest appraisal of the commercial potential for the product is required, 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 and appropriate processes for industrial production.

The new OCR 'Product Design' Specification gives greater prominence to the design and making of a marketable product. This section of the current specification is an ideal opportunity for Centres to prepare, by increasing their coverage and emphasis of marketing aspects.

Centres' assessments in this section were usually lenient.

2524/01 Product Design Section A

General Comments

All questions were attempted with numbers 1, 2 and 3 being the most popular. There was little variation in the number of candidates answering these questions. However, very few candidates attempted to answer questions 4, 5, 6 and 7. It was noted by the examiners that a large number of candidates failed to correctly address the actual discussion points being asked in part (c). 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 candidate to focus on the important key words of the question and not put their own interpretation on the question. The more successful candidates will also include a small plan at the commencement of their discussion. This tactic helps candidates focus their discussions through a logical pathway and helps prevent repetition of the issues they are raising. 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 score two marks for this part of the question.
- (ii) Most candidates were able to gain two marks for this part of the question with candidates considering the stability and sheet size in their answers.
- (iii) Most candidates scored at least two marks for this part of the question. It was disappointing to note that even at this level, some weaker candidates relied on the answers of screws and 'nails' incorporated with glue as suitable for a knock down joint. Credit was given for dowels where there was clear evidence of them being used as a locating component. Better candidates were able to provide two clear sketches of different suitable KD fittings.
- (b) Many candidates were able to give a brief description of how the door frames would be constructed. Better responses included details of how the frame would be routed and the fact that the panels would be floating.
- (c) This section was generally poorly answered as many candidates failed to address the environmental implications of using manufactured boards. The weaker candidates wrongly centred their responses solely to landfill. There were a number of candidates who hinted that there may be some environmental problems with the binding agents used in boards but their knowledge was rather vague on this point. There were also few responses centred on the production processes using manufactured boards. The better candidates also discussed the positive environmental implications rather than relying solely on any negative impact that manufactured boards may have.
- 2 (a) (i) Most candidates were able to give two reasons why stainless steel is a suitable material for the drum of the drier.
- (ii) Most candidates were able to give at least one suitable reason, with many gaining both marks in this part.
- (iii) The majority of candidates were able to fully describe at least two reasons for

using standardised components. Better candidates correctly identified all four reasons including the ease of maintenance during use.

- (b) (i) Most candidates were able to give an outline description of spot welding. However the detail given in the labelled sketches was disappointing in the majority of answers with candidates relying totally on written descriptions.
 - (ii) This section was generally well answered. Most candidates were able to score at least two marks in this section. Weaker candidates confused the process with electroplating or a spraying process. Better candidates fully described the process of galvanising including a pickling process to clean the sheet prior to dipping.
 - (c) This section was generally poorly answered as many candidates failed to address the moral implications of mass production of electrical domestic appliances. The better candidates considered points such as increased energy demands and the commercial pressures exerted on consumers to buy appliances and to continually update them.
- 3
- (a) (i) Most candidates were able to correctly identify two reasons why PE was a suitable material for the container.
 - (ii) Most candidates were able to correctly identify two reasons why PE was not commonly used for carbonated drinks.
 - (iii) Most candidates correctly named at least three other suitable plastics used in food packaging.
 - (b) Most candidates were able to describe the production cycle for blow moulding 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 finite issues of non renewable resources. Weaker candidates tended to drift into discussions centred on alternative energy resources without considering the impact of using non renewable resources alongside their arguments.
- 4
- (a) (i) Most candidates were able to identify two reasons why card was a suitable material for the wrap.
 - (ii) Generally well answered with most candidates correctly stated two high volume print method.

- (iii) Many candidates were able to score at least two marks for this section although many of the responses lacked the detail required to score maximum marks. The better candidates described how the presse forme blades varied according to their task and how the cutting blades were protected by foam or rubber guards.
 - (b) There were a significant number of candidates who had difficulty answering this part of the question. The lack of graphic detail was evident in the candidates who may have attempted this question and who had not the necessary graphic skills or background to attempt this type of question. The better candidates described in detail how the fold lines are incorporated into the design to aid in its form without weakening the integrity of the wrap. These better candidates were also able to describe clearly how the base locked.
 - (c) There were a few good answers to this part of the question, but candidates tended to fail to make references to the fact that the discussion should have centred on high volume production. Better candidates generally centred the responses on the capital costs involved and the lowering of unit cost that this type of production could produce.
- 5
- (a) (i) Most candidates were able to give two reasons why this type of card was suitable for the production of this item.
 - (ii) Most candidates were able to give two surface enhancements that were suitable for the card.
 - (iii) Generally well answered with most candidates being able to describe the embossing process.
 - (b) This part of the question was generally poorly answered and again showed the lack of knowledge of graphic skills and its application to card engineering. The better candidates were able to give quite detailed responses and clearly showed through a series of sketches how the mechanism would work.
 - (c) Generally well answered. The majority of candidates were able to give several good reasons in support of their discussions. The better candidates considered issues such as language, race and sexual issues and why these could be important in relation to a consumer.
- 6
- (a) (i) This question was one of the least popular questions on the paper. Most candidates were able give two reasons why fleece fibre was a suitable material for the lining of the jacket.
 - (ii) Most candidates correctly identified two ways of securing the lining to the outer jacket.
 - (iii) This part was generally poorly answered with candidates giving only vague descriptions of the structure of the breathable fabric. Better candidates were able to draw a detailed and well label diagram of the three layers that make up the fabric.

- (b) (i) This part was generally very well answered with most candidates giving a good description of how the fabric would be set up prior to embroidery and run in a CNC sewing machine.
 - (ii) Most candidates were able to score at least two marks in this section although there were many vague responses of how the seam would be stitched. The better candidates were able to describe how the seam would be pressed open and folded before final stitching.
 - (c) This section was generally poorly answered as many candidates gave very generic smart material responses and failed to expand on the issues they raised. The better candidates considered points such as how smart materials were being used in sports clothing and garments or being incorporated into safety clothing.
- 7
- (a) (i) Most candidates were able to give four suitable characteristics.
 - (ii) Most candidates were able to give a good description of a suitable durability test and supported their responses with sketches.
 - (b) This part was generally well answered with most candidates correctly describing several stages of the order of the manufacture of the quilt.
 - (c) A significant number of candidates only gave superficial descriptions of the implications of attaching eco labels. It was apparent that many of the weaker candidates were unsure of what an eco label was. The better candidates were able to give several good reasons of why eco labels were beneficial in informing the consumer of the chemical and environmental impact standards that the material or product conforms with.

2524/02 Product Design

General Comments

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

Administration

There were few problems this session.

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 and 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

Many of the comments made here reiterate those from previous reports to Centres.

On the whole examiners were pleased with the quality of work seen this session.

For some candidates poor time management is a major handicap with clear evidence that the final sections are either rushed or unfinished. Examiners are aware of the pressure on candidates in this examination and marks are awarded with this in mind. It is recommended that a significant part of the preparation for the exam should include techniques to allow the candidates to present ideas quickly and clearly.

The way in which Centres use the pre-release materials can have a significant impact on the results. The themes for the examination deliberately attempt to 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 continues to be an area that discriminates clearly between more and less able students.

To earn full marks a specification point must be both relevant to the set question and justified or explained. It is important that candidates respond to the question set and many find this difficult, tending to rely on largely generic statements (which get no mark) or statements pre-prepared from the published themes (these seldom receive full marks).

Candidates are becoming better at ensuring that specification points are justified and there were a significantly smaller number of candidates this year who produced a set of unjustified points. It is helpful when candidates actually include words such as "because", "so that" or "in order to" when writing their statements, as it explains to the examiner their justification.

Report on the Units taken in January 2009

A significant number of candidates produced more than the required eight specification points. This is seldom successful because it wastes precious time and usually produces generic points which cannot be given any credit.

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. To be awarded high marks the ideas must be *functionally different* rather than relatively superficial changes in shape of configuration. Credit is given for sketches which explore and develop possible variations within a concept and this is often an indication of the work of more able candidates.

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.

Detail 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 continue to produce quite detailed 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', 'card' and so on. 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 sunglasses in question 1, or the dimensions of food items from question 5) 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. Candidates can use an "evaluation of ideas table" with evaluative comments and this can be a good method for candidates to score highly. 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):

This section was completed well by many candidates although a significant number appeared to have run out of time before it was started or completed.

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 (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 two pages of ideas instead. It was clear from looking at this section that candidates 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 the better 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-away 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.

Comments on Individual questions:

Question One: Storage of sun glasses

This question was answered reasonably well with the majority of candidates producing good specification points and designs which had some commercial appeal.

Question Two: Storage of food waste before composting

Many candidates misinterpreted this question (possibly because they had tried to use the theme of 'composting' to anticipate the question) and produced specifications for garden compost bins rather than containers to be used *before* composting. This resulted in poor marks for the specification although subsequent sections were not penalised for this error.

Question Three: Dual purpose kneeling and storage unit for gardening

This question produced some good solutions both in terms of specification points and design proposals. Unfortunately the products proposed by some candidates were rather crude designs suitable only for craft level manufacture and lacking the sophistication expected of products available commercially.

Question Four: A new bedtime product for children

This question produced a very wide range of responses from the very traditional (such as teddy bears) to the technologically advanced. The latter often lacked any indication of understanding the construction or functional aspects.

Question Five: Fast food packaging for airlines

Although the majority of candidates answering this question produced a reasonable range of valid specification points many found it difficult to find a range of suitably different ideas: for many, solutions were simply copies of packages already commonly available. Another disappointing area was the almost universal lack of knowledge of materials suitable for commercial production of such a relatively common product.

2525/01 Systems and Control Technology

General Comments

The majority of candidates who sat the paper opted to do questions 1, 2 and 3 (50% of candidates attempting Q.3) Few candidates attempted the pneumatics questions. It was also evident that Centres had focused on specific areas of the specification.

Once again it was found that many candidates had problems with questions containing calculations. Using a calculator does not seem to be the problem. Some candidates fail to understand how to tackle the problems at all. Simple errors like using the correct units and applications of formulae caused many to lose marks. At this level and with the formula provided candidates should be able to tackle the simple calculations required of them.

The 'discuss' part of the question was answered more fully than previously. It is evident that Centres are using advice given at INSET or in previous reports as some students are marking P, Q and S criteria in their responses.

Comments on Individual Questions

- 1 (a) (i) Most candidates answered this question correctly.
- (ii) The majority of candidates answered this correctly; some failed to recognise the Schmitt trigger inputs.
- (iii) The majority of candidates answered this correctly.
- (iv) Only a few candidates answered this correctly, very few recognising the double inversion to ensure correct orientation of the signal.
- (b) (i) Most candidates answered this question correctly.
- (ii) The majority of candidates produced an appropriate diagram for the output; however, very few provided the annotation.
- (c) (i) Very few candidates correctly produced the truth table.
- (ii) Most candidates answered this question correctly.
- (iii) No candidates answered this question correctly, many confused duty cycle with product life span.
- (d) Responses were very inconsistent. Candidates in some cases mixed up the benefits of LED and LCD.
- 2 (a) (i) Most candidates answered this question correctly.
- (ii) Candidates comprehended the temperature and resistance changes, very few however identified that the changes were non linear.
- (iii) Candidates in general identified the correct component.
- (b) (i) Very few candidates answered this question correctly.
- (ii) Most candidates failed to answer this question correctly.

- (c) (i) Very few candidates gave a clear explanation of an open loop gain, a number did however recognise the implication of no feedback.
 - (ii) Few candidates clearly understood the relevance of impedance.
 - (iii) Only a limited number of students could clearly comprehend the graph.
 - (d) Generally candidates answered this question well.
- 3 (a) (i) Few candidates gained full marks; the majority identified only one component correctly.
- (ii) The majority of candidates answered this question correctly.
- (b) (i) Generally well answered by most.
- (ii) Candidates recognised that a longer arm gives a greater force.
- (c) (i) Very few candidates recognised an application for this type of thread.
- (ii) A limited number of candidates did not attempt this section. Generally this question was not well answered, due to the response given in (c) (i).
- (d) (i) Candidates generally successfully answered this question.
- (ii) This question was not answered well by any candidate.
- (e) A number of candidates failed to recognise the difference between fixed and variable costs.
- 4 (a) (i) Candidates generally answered this question correctly.
- (ii) Few candidates gained full marks for this question .there was a great diversity in the clarity of diagrams and supporting annotation.
 - (iii) This question was not well answered; many incorrectly identifying thrust bearings as suitable for axial loads.
- (b) Many candidates failed to recognise the need for a flexible coupling, opting to use gears.
- (c) (i) Few candidates managed to answer this calculation question correctly.
- (ii) Few candidates managed to answer this question correctly as a result of (c) (i). Candidates also had problems in using the required formulae.
- (d) Few candidates answered this question correctly.
- (e) This question was generally well answered.
- 5 (a) This question was generally well answered by candidates.
- (b) (i) Candidates generally answered this question well and comprehended the outcome of the air bleed being blocked.
 - (ii) The majority of the candidates produced a viable solution.

- (iii) This question was generally correctly answered by candidates.
- (c) (i) Candidates generally answered this question well.
 - (ii) Candidates provided viable solutions, however many were let down by poor diagrams.
- (d) This question was generally well answered by candidates.
- 6 (a) (i) Few candidates correctly identified the function of the component.
 - (ii) Candidates in a number of cases failed to explain clearly the effect on the system by closing component Z.
 - (iii) Candidates failed to comprehend the function of the air cushion.
- (b) (i) The majority of candidates failed to calculate the correct answer.
 - (ii) Candidates in general correctly calculated the answer.
 - (iii) Candidates failed to answer this question correctly.
 - (iv) The majority of candidates correctly identified component Z.
- (c) Few candidates comprehended a connection between the pressure pad and solenoid. This question was poorly answered with few producing appropriate diagrams.
- (d) Candidates failed to apply the formulae to answer this question correctly.
- (e) Candidates answered this question well, clearly comprehending the implications of non – recyclable waste.

2525/02 Systems and Control Technology

General Comments

Overall candidates responded more favourably to this section of the examination. A little over half of the candidates elected to tackle question two and most of the remainder attempted question three. It is worthy of note that some candidates whose theoretical knowledge had prevented them gaining a high mark in component one were still able to gain a reasonable overall mark because they had developed their designing skills and had used them for this part of the paper. Centres are asked to reinforce with candidates the necessity of circling the question number they are answering and clearly writing their name on each sheet.

Comments on each of the marking criteria:

Specification Points (SP)

Candidates must ensure that the points offered do 'directly relate to the given situation'. Some candidates fail to gain marks in this section because comments are either generic or not fully justified. A significant number of candidates were however able to access the majority of marks in this section. It is suggested that candidates avoid general 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 could be even more difficult to justify.

Initial Ideas (ID)

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. Accurate highlighting helps with the marking and is an aid to organising candidates work during the examination.

When evaluating their ideas candidates must ensure they reference the specification. Putting specification points as numbers in circles, underlining specification statements or using a highlighter should be encouraged.

Centres should note that this section of the examination is worth 66% of the total marks. Thorough preparation in practice examinations will enable candidates to develop their own style of presentation and allow them to access the full range of marks in the time available.

Features suitable for development (FD)

Most candidates attempted this section. Those who performed well offered a range of features from their initial ideas that were well suited to development and justified them against the specification. The features selected by candidates should cover the majority of the overall design, be realistic and have sufficient detail drawn or explained. Candidates should be reminded that repeating the specification is not an acceptable response without a clear intellectual justification of the points chosen.

Efficient Communication (CS)

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 their development can be easily 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. Candidates should be encouraged to look at the mark scheme to see where marks are awarded prior to answering the paper.

Grade Thresholds

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

Unit Threshold Marks

Unit		Maximum Mark	A	B	C	D	E	U
2519	Raw	120	96	84	72	60	48	0
	UMS	120	96	84	72	60	48	
2520	Raw	90	54	48	43	38	33	0
	UMS	90	72	63	54	45	36	
2521	Raw	90	52	46	40	34	28	0
	UMS	90	72	63	54	45	36	
2522	Raw	90	72	63	54	45	36	0
	UMS	90	72	63	54	45	36	
2523	Raw	90	72	63	54	45	36	0
	UMS	90	72	63	54	45	36	
2524	Raw	120	81	73	65	58	51	0
	UMS	120	96	84	72	60	48	
2525	Raw	120	81	73	65	58	51	0
	UMS	120	96	84	72	60	48	

Specification Aggregation Results

Overall threshold marks in UMS (i.e. 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	9.44	30.00	55.56	78.89	97.22	100	180
3823	0.00	7.69	23.08	61.54	92.31	100	13

3822: 180 candidates aggregated this series

3823: 13 candidates aggregated this series

	A	B	C	D	E	U	Total Number of Candidates
7822	7.41	29.63	66.67	88.89	100	100	27
7823	0	0	0	0	0	0	0

7822: 27 candidates aggregated this series

7823: 0 candidates aggregated this series

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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