OCR
RECOGNISING ACHIEVEMENT

GCE

Design & Technology

Advanced GCE **A2 7822-3**

Reports on the Units

January 2010

7822-3/MS/R/10J

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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 specification 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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CONTENTS

Advanced GCE Design and Technology: Product Design (7822)

Advanced GCE Design and Technology: Systems and Control (7823)

REPORTS ON THE UNITS

Chief Examiner's Report

General comments

Centres should be aware that there is now only one more opportunity to enter the OCR Legacy A2 Level qualification in Design and Technology.

June 2010 will be the last opportunity to enter candidates for the following A2 Units:

2522 Designing
2523 Making and Evaluating
2524/01 Product Design 2
2524/02 Product Design 2
2525/01 Systems & Control Technology
2525/02 Systems & Control Technology

The majority of entries for the A2 specification in January were for resubmitted candidates.

Unit 2522 Designing and Unit 2523 Making and Evaluating

General Comments

Most Centres submitted their marks to the Moderator using the correct 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.

There was only a very small entry in this session. The vast majority were candidates resubmitting coursework from the June 2009 session, with approximately the same number of candidates entering for Unit 2522 as for Unit 2523. In some cases it was evident that considerable efforts to improve the standard and quality of responses had been made since June 2009.

A range of coursework 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.

It was pleasing to see a good number of sensibly scaled projects. Projects that are realistic and manageable in the time scale allow candidates to explore a range of options and then go on to refine their design before producing a high quality complete outcome commensurate with their abilities. However, in several cases the overall complexity of the projects and the range and/or depth of skills involved in the designing and making was insufficient for candidates to attain the marks awarded by the Centre. In such cases adjustments were necessary to bring the Centres assessments into line with the OCR standard. The correct choice of project is of paramount importance, and should arise from very careful consideration of the Assessment Criteria for the Units. Detailed discussions between the candidate and the teacher are essential before a project is embarked on which may disadvantage the candidate.

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

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

The majority of Centres marked realistically and fairly accurately overall. However, several Centres required adjustments to their marks, for both Unit 2522 and Unit 2523.

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

Candidates' development and application of ICT and CAD CAM skills was evident in many cases. This is an aspect of the coursework that continues to progress and improve.

Reference throughout the process of designing and making to the needs of a target market was generally weak, with very few candidates benefiting from regular consultations with a client during the design development. Exploration of aspects of commercial manufacture and the

implications for design was limited in almost all cases. The wider context for the product and its potential in the commercial marketplace should be considered from the start and be integral in almost all sections of both Units. Centres should note that marketing aspects are essential elements throughout the A2 coursework unit for the new specification.

Centres and candidates submitting e-portfolios should ensure that it is in PowerPoint, which is the approved OCR format.

Comments on Individual Sections

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)

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.

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.

When compared with OCR standardising examples, Centres' assessments in this section tended to be slightly lenient. In general, greater depth and detail was required, giving reasons for the choice and value of the project, the specific need(s) and opportunities identified, with greater exploration of specific issues to be considered.

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)

In most cases Centres' assessments were lenient; with very few candidates fully satisfying the assessment criteria to earn the highest mark.

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

The intention is that the plan is devised at the outset to set out the various designing tasks relating to the specific chosen project, stage by stage, with key deadline dates, and then used as a continuous working document logging and monitoring actual progress. This emulates industrial and commercial practice and is an important and dynamic feature of any product development.

SOURCES of INFORMATION. Identify primary and secondary sources of information relevant to the problem (3 marks)
The starting point for the identification of sources of information is the identification of the key information required. The work of section 1.1 is relevant here. Along with the

time plan, candidates should see this section as a framework for their investigations and information gathering, as a checklist for the specific research necessary for the designing.
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)

In general, research presented in this section lacked the depth (rigorous close-up examination and testing) and specific technical detail (constructional details, specific materials and finishes) to be of real value to the designing. Internet images were widely used, and candidates required personal contact with the products in order to provide the technical details required to guide the designing.

The analysis of similar products using images from the Internet is of limited value, and in many cases the analysis presented by candidates did not support the Centres' marks. A thorough and rigorous personal evaluation and testing of existing products in real life is required to give the detailed information that candidates need at this level, and to justify high marks.

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)

Candidates need to use the above list when planning their research to ensure that they collect sufficient data to allow them to address each of these issues in depth. The key purpose here is to develop a detailed and justified design specification.

Candidates should identify and analyse the limiting factors relating to their chosen product, the issues that put boundaries around its design. It entails finding and considering the restrictions, and gaining the important information that will give the framework to the designing

In most cases, candidates' responses were over-rewarded by Centres when compared with OCR benchmarking examples, for the following reasons:

- Most candidates had identified a range of constraints, e.g. social, moral, and environmental factors. Responses tended to state environmental, economic and social issues with limited reference to the specific product being designed.
- Evidence of a questionnaire or survey was common. In this section the purpose of surveys is to gain specific and detailed data that will guide the design of the product and its essential functional requirements and features.
- The majority of candidates failed to include key information such as the details and dimensions of items to be stored or fitted into the product, or details relating to the intended location for the product.
- Few candidates looked at user needs in depth, and generic consideration of issues was very common. Candidates' work in this section needed to be more specifically related to the chosen product.
- Responses often centered on the candidates' personal comments and opinions rather than the information and influences on the designing arising from their research.

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

The Design Specification is an essential element in the design process, summarising the earlier research and analysis sections, and giving a clear framework and reference point for the design work which follows. It is crucial that the Design Specification gives a detailed basis for the objective evaluation of ideas, models, solutions, and outcomes.

Generic statements should be awarded low marks. For high marks to be awarded, candidates need to state requirements by reference to specific aspects of the product to be designed, setting measurable targets (i.e. sizes, capacities, performance, and features) in numerical form.

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)

Most candidates produced a useful range of initial ideas, although many showed little innovation and were based on fairly obvious commercially available designs. The best examples showed creativity and lateral thinking and Candidates generally began well by showing a reasonable range of concept ideas but many were then let down by not showing a true progression and development of ideas explaining and justifying a final proposal. Candidates often tended to jump from initial concept sketches to a final detailed design with little evidence of significant thought. It was also quite rare for information gathered in Section 2.4 of this Unit to be acted upon in the development process.

There was a considerable difference in intellectual demand. Candidates choosing very simple products with little complexity need to be aware that considerable design exploration and detail will be needed if their work is to achieve high marks.

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

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

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)

As in June 2009, there was a noticeable improvement in the quantity and quality of CAD modelling. 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.

The most common failing was not to perform any meaningful evaluation of the models. Where this was the case, the opportunity for the models to inform future designing was lost.

Thinking ahead to the new specification, Unit F523, Design, Make and Evaluate, Centres are reminded that models are an integral part of designing and should be being produced as design ideas are explored and developed. Many candidates completed their design work and then made models to check the feasibility of the total design, whereas ongoing 2D and 3D modelling of the various design elements could have further improved and refined their overall design.

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

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

This can be carried out separately from the development of ideas but such an approach does not aid the flow of ideas. This is best achieved by the use of annotation to evaluate ideas as they are developed.

Professional designers evaluate their design ideas and proposed solutions through contact with their client or target market. Candidates are encouraged to take this sort of approach more seriously, as it is likely to provide the most helpful feedback into the design development and achieve the most suitable final outcome.

In a few cases, where annotation and comments tended to be descriptive rather than evaluative, and not always in sufficient detail, Centres' marks were slightly lenient. Otherwise, Centres' assessments in this section were broadly in line with the OCR standard.

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

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

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

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

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)

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

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

Centres' assessments 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)

It is a requirement for CAD to be used for the production of these drawings and it is also essential that they contain sufficient detail to enable third party manufacture without further guidance.

Most candidates had attempted a CAD drawing. In general, solutions were not fully defined, and the CAD drawings produced did not include sufficient detail for third party manufacture. Drawings sometimes 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.

In some cases the product as designed was relatively simple and straightforward, and the skill level required to produce CAD solution drawings did not enable the candidate to access the higher marks awarded by Centres.

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

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

This section was accurately assessed in most cases. Many candidates who had produced visually excellent folders, had been awarded maximum marks, and Moderators were pleased to confirm this. Few candidates earned marks in the lowest mark band.
A range of hand techniques, ICT applications and CAD were evident in most folders, and the overall presentation of folders continues to improve, with more able candidates producing visually stunning folders of near degree-level quality. Coherence and fluency are key factors for success, and candidates who clearly communicated their process of designing through the various sections scored high marks.
Digital technology featured strongly in most folders. 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 some leniency was evident. In some cases the complexity of the tasks limited the marks possible. The marks awarded must reflect the demand and challenge involved.

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

In many cases attention to Health and Safety and Risk Assessment was superficial. Comments such as *'ensure the machine is set up correctly'* were common. Centres are recommended to place a higher emphasis on these aspects of the planning.

Quality Control statements also tended to be generic. Enlargement of the points made, with specific reference to the product or component being manufactured was needed to indicate the precise quality control tasks during the making process.

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

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

Some outcomes were of a very high quality indeed, showing great attention to detail in complex design solutions. In some cases the project required more complex means of making for the candidate to be able to access the higher mark bands for A2 level coursework.

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

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

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

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

There is clearly a fine balance to be achieved to ensure that the making of the chosen outcome is realistic and achievable in the time available, yet has sufficient complexity for the candidate to demonstrate making skills at a level commensurate with their ability. Project management from day one is essential, and should include regular discussions between teacher and candidate. This may mean changes or modifications to the direction of the project in order to facilitate an outcome, commensurate with the requirements of Advanced level coursework.

When compared with OCR standardising examples, Centres' marks in some cases were lenient. Evidence of greater breadth and/or depth of skills by candidates was required in several cases for higher marks to be attained.

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

Centres' assessments in this section tended to be lenient when compared with OCR benchmarking examples, with very high marks often awarded to well finished but undemanding products.

'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.

1.2c INNOVATION. Demonstrate innovation (12 marks)

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

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

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

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

A record of progress was usually well presented and communicated in terms of a diary of production, but the requirement to evaluate was not always properly addressed. The intention is 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 or translated into commercial terms.

2 TESTING and EVALUATION (21 MARKS)

Important note:

These last five sections (2.1 to 2.5) were often rushed and of a lower quality than the foregoing sections, with candidates allocating insufficient time to satisfy the specific requirements of each section. Nearly 12% of the marks for the A2 coursework are allocated to these five sections.

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)

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

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

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

Centres' assessments in this section were lenient in some cases when compared with OCR's benchmarking and standardising folders.

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

In general, Centres' marking in this section was lenient.

Any external evaluation should be presented first-hand and not simply reported. Formal and real-life evaluation and testing of the working prototype by the client, a potential client, a representative of the target market for the product, or an expert in the specific design field, will raise specific issues for attention by the designer. It will give independent opinion and positive support to improving the product. It is the response of the candidate to this external evaluation that is marked in this section. A response by the candidate is specifically required by the assessment criteria.

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, or a photograph of the testing taking place) high marks should not be awarded. 'Hear-say' evidence is not acceptable. A reported conversation or quotes from friends do not merit top marks.

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

The success of this section is very dependent upon the effectiveness of the earlier sections of evaluation and the thorough analysis of strengths and weaknesses. The best work 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.

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

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

Centres' marks in this section were usually accurate.

Consideration of the costs for the one-off prototype, the likely commercial manufacturing costs, and the likely selling price for their product, relating them back to their own research prior to the designing, are the key requirements 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, plus images from the Internet, was common, and meaningful drawn design modifications were rare. The majority of responses focused on manufacturing changes rather than design changes, e.g. pressed metal to plastic injection moulded.

Considering how the design should change for commercial manufacture, work in this section may include the candidates' exploration of integrated or moulded-in fittings such as catches, clips, and hinges to replace the separate components used in the design of the prototype. Other avenues that may be explored by candidates are the reduction in number, or the standardisation, of components; and changes which would enable the product to be marketed as a self assembly product.

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

2524 – Product Design 01

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 again noted by the examiners that a significant number of candidates entered for this paper failed to correctly address the actual discussion points being asked in part (c). Centres have been consistently recommended to instruct their candidates to read through the whole question paper before selecting the questions they attempt and in particular section (b). Centres have also been, over a number of sessions, 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.

(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 thought that using a wood screw through the surface of the desk and into the metal framework was a satisfactory way of securing the desk top. Credit was given for good explanations and/or sketches of suitable joining methods.

(b) (i) Many candidates were able to give a brief description of how the top laminate would be attached to the manufactured board. Most candidates suggested a contact adhesive being suitable. Better responses included details of how the laminate would be fed off a roll and pressure used to firm the adhesive bond and to remove air pockets.

(ii) This section was generally well answered with the better candidates describing how the edge might be routed and an edge trim applied, or the edge having an applied finish.

(c) This section was generally poorly answered as many candidates failed to address the implications during the manufacturing of furniture when using manufactured boards. The weaker candidates wrongly centered their responses solely to flat pack furniture. 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 centered on the production processes using manufactured boards. The better candidates also discussed the positive manufacturing implications rather than relying solely on any negative impact that manufactured boards may have whilst being worked with.

2 (a) (i) Most candidates were able to name two specific metals used in the manufacture of cycle frames. Credit was given to candidates who gave chromium as one of their answers.

(ii) Most candidates were able to name at least one suitable finish, with many gaining both marks in this part.

(iii) The majority of candidates were able to name two of the forces that act within the bicycle frame when in use. Better candidates correctly identified the forces with a force diagram as part of their answer.

(b) (i) Most candidates were able to gain at least two marks for this section. The weaker candidates tended to describe an electro-plating process rather than an electro-static process. Better candidates were able to describe how the frame would be cleaned or pickled prior to the commencement of the application of the coating.

(ii) This section was generally well answered. Most candidates were able to score at least two marks in this section. Better candidates fully described the process aligning the frame and using some type of laser or tolerance gauge to assure accurate alignment of the frame.

(c) This section was generally poorly answered as many candidates failed to address the how modern materials were used in high performance sports equipment. These weaker candidates simple described pieces of sports equipment rather than how the materials affected design or met the expectations of users. The better candidates considered points such as increased performance and the increased use of sports science in developing products.

3 (a) (i) Most candidates were able to correctly identify at least three reasons why a thermo-setting plastic was a suitable material for the 13 amp plug.

(ii) Most candidates were able to correctly identify four characteristics and properties of plastics that were modified by additives. Credit was awarded for any type of plastic and was not restricted to thermo-setting plastics.

(b) Most candidates were able to describe the production cycle for compression 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 health and safety issues of mains voltage domestic appliances. Weaker candidates tended to remain on safety issues and were unable to develop their discussions outside on this area.

4 (a) (i) Most candidates were able to identify two reasons why laminated paperboard was a suitable material for the juice carton.

(ii) Generally well answered with most candidates correctly identifying two tamper indicators used on cartons. Although not asked for, it was pleasing to note the accompanying sketches used to enhance their answers.

(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 were able to describe the function of each layer rather than simply naming them.

(b) (i) 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 carton. These better candidates were also able to show clearly the location of the plastic insert hole.

(ii) 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 of cutting or creasing. They were also able to describe how the cutting blades were protected by foam or rubber guards.

(c) There were a few good answers to this part of the question, but candidates tended to be unaware that this type of carton is very difficult to recycle due to its composite nature. Better candidates generally centred their responses on the re-use advantages of glass, weight comparison issues and energy use in production.

5 (a) (i) Most candidates were able to name two other products that use holographic images.

(ii) Most candidates were able to give two reasons why this type of image is used.

(iii) Generally well answered with most candidates being able to give at least three security measures

(b) (i) This part of the question was generally poorly answered and again showed the lack of knowledge of processes other than printing methods used in the printing industry.

(ii) Generally well answered with some comprehensive descriptions of the off-set lithographic printing process. Some good diagrams usually accompanied the description.

(c) Generally poorly answered. The majority of candidates were unable to consider what the implications were to the printing industry with the widespread development of ICT. The focus of the answers was generally quite narrow and tended to centre on the transfer and storage of information. Better candidates were able to broaden their answers to include possible security issues of others copying images for their own use against copyright and the cost to the industry due to people being to do more of their own printing at home.

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

(a) (i) Most candidates were able name two pre-manufactured standard components used to make the bag.

(ii) Most candidates correctly named one fibre and correctly gave a reason as to its suitability.

(iii) This part was generally poorly answered with candidates giving only vague descriptions of how the pattern would be created in a decorative weave. Better

candidates were able to draw a detailed and well label diagram of a loom and its use.

(b) This part was generally very well answered with most candidates giving a good description of the logical order of manufacture.

(c) This section was generally poorly answered as many candidates gave very generic responses and failed to expand on the issues they raised. The better candidates considered points such as how CAD/CAM had improved. The points included the improved speed and accuracy of the design and manufacture. Ease of modification and direct links to machines were also common responses from the better candidates.

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

(ii) Most candidates were able to give a good description of a batch dyeing process 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 quilting.

(c) A significant number of candidates only gave superficial descriptions of the implications of recycling textile products. The better candidates were able to give several good responses that included the collection, sorting and re-processing of a variety of textile products.

2524 – Product Design 02

General Comments

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

Work of Candidates

Despite the relatively small entry for this legacy examination a wide range of work was seen by examiners. Better candidates combine sound technical knowledge with creativity and excellent communication.

For some candidates poor time management continues to be a major problem, with final sections that are either rushed or unfinished.

Comments on each of the marking criteria:

Specification Points (SP):

This section discriminates well between the more and less able candidates. The more successful concentrate their thinking on the functional and user needs of the product, and ensure that the relevance of all points are explained.
There is often evidence of mnemonics used to prompt candidates to cover a broad range of specification points. Unfortunately, this often leads to a list of generic specification points that cannot be awarded marks unless made relevant to the question answered through specific references to the situation and careful justification.
It is disappointing that many candidates continue to produce specification points that lack justification. It is helpful if candidates include words such as “because”, “so that” or “in order to” when writing their statements, as it prompts them to write an identifiable justification.

Initial Ideas (ID):

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

Range of Ideas (R):

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

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

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

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

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

Detailed consideration of Construction (C):

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

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

Consideration of specific Materials and Components (M):

As above, the technical knowledge required for this section often differentiates between able and less able candidates. Most candidates now remember to suggest materials for construction and very few continue to use generic terms such as 'wood', 'plastic' or 'card'. Unfortunately, in too many cases the materials are unsuitable for the product and its application, and rarely is the choice of material justified by explaining a property that is relevant to the product and its application.

Consideration of Dimensional detail (D):

As in previous sessions there was much evidence of candidates simply taking dimensions given in the question 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 focused on the positive aspects of their ideas, with no reference to possible problems or improvements. Some used an "evaluation of ideas table" which can be successful if completed with evaluative comments. However, candidates should not use such a table with simple ticks, crosses or numbers which do not really show the depth of thought required at this level. More able candidates were able to offer objective evaluation against all of their specification points.

Features suitable for development (FD):

Appropriate features identified and clearly described (F):

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

Appropriate Justification of the choices made (J):

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

Communication skills and techniques (CS):

An extremely wide range of work is seen; in terms of graphical techniques better examples include different drawing styles (such as sections, cut-aways and hidden detail to show construction and functionality) as well as the more obvious 3D sketches. In terms of annotation; logical layout, clear reference to the marking criteria, detail and legibility are all evident.

There appears to be a trend toward increased use of quite lengthy passages of text to explain designs rather than simple, but detailed, sketches which used correctly could provide the necessary information more clearly, concisely and quickly.

Comments on Individual questions:

Questions four and five proved the most popular.

Question One: Protective equipment for young children:

Some excellent responses were seen to this question showing innovation, technical knowledge of materials and construction.

Question Two: Product to customise office desk for shared working:

Several candidates who attempted this question mis-interpreted the design situation and designed an office desk rather that a product to be used in conjunction with an existing desk.

Question Three: Portable modelling/craft activity work station:

This question was reasonably well answered allowing candidates to draw on their personal experiences.

Question Four: Transporting of tools and equipment:

A variety of solutions were seen in response to this question ranging from tool belts to large four wheeled trolleys. Depending on the specification written by the candidate all were equally valid and could be awarded good marks.

Question Five: Storage for car cleaning products:

This was the most popular question; most candidates interpreted the need as a storage system that would be kept in a garage for use when cleaning the car. Others chose to design a product that would be kept in the car ready for use at any time. Both approaches were acceptable resulting in good solutions in some cases.

2525/01 Systems & Control Technology

General Comments
All candidates who sat this paper opted to do either questions 3 or 4.
While candidates demonstrated a good theoretical knowledge the 'discuss' part of each question was not answered comprehensively.

Comments on Individual Questions

3(a)		The majority of students answered this question correctly.
3(b)	(i)	Few candidates gave a coherent explanation of the function.
	(ii)	The majority of candidates answered this correctly.
	(iii)	Candidates correctly identified a type of clutch.
3(c)		The majority of candidates correctly answered this question.
3(d)		Most candidates calculated this correctly (or within tolerance).
3(e)		Candidates in general gave valid answers.
4(a)		The majority of candidates answered this correctly.
4(b)	(i)	Candidates correctly identified the gear ratio, however incorrectly wrote the ratio.
	(ii)	As with 4b)(i) candidates inverted the ratio calculation.
4(c)	(i)	Many candidates failed to identify a suitable bearing type.
	(ii)	Candidates failed to comprehend the required function of the bearing, usually as a result of incorrectly identified an appropriate type for 4(c)(i).
4(d)	(i)	Candidates in general answered this question successfully.
	(ii)	Candidates correctly calculated the stress.
4(e)		While candidates recognised the advantage of a counter balance few gave adequate justification.
4(f)		Candidates in general gave valid answers.

2525/02 Systems & Control Technology

General Comments

Overall candidates responded a lot better in this section of the examination.
All candidates attempted question three.

Specification

Candidates must ensure that the points offered do 'directly relate to the given situation'. All too often candidates fail to gain marks in this section because comments are generic or a statement is not fully justified.

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

Initial Ideas

Candidates need to offer a reasonable range of alternative ideas. This approach allows candidates to access the full range of marks provided their sketches are suitably annotated. When evaluating their ideas candidates must ensure it is referenced to the specification and that the evaluation and the specification must agree. Putting specification points as numbers in circles, underlining specification statements or using a highlighter are just three ways to ensure evaluation statements and the specification points are linked. If candidates practise doing this section of the paper they will develop their own style of presentation that suits them but still allows them to access the full range of marks. This section contains 66% of the marks so it is worth the effort.

Features suitable for development

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

Efficient Communication

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

Grade Thresholds

Advanced GCE Design and Technology (7822, 7823)
January 2010 Assessment Series

Unit Threshold Marks

Unit		Maximum Mark	A	B	C	D	E	U
2522	Raw	90	72	63	54	45	36	0
	UMS	90	72	63	54	45	36	0
2523	Raw	90	72	63	54	45	36	0
	UMS	90	72	63	54	45	36	0
2524	Raw	120	73	65	58	51	44	0
	UMS	120	96	84	72	60	48	0
2525	Raw	120	77	70	63	56	50	0
	UMS	120	96	84	72	60	48	0

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
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
7822	14.89	42.55	68.09	91.49	100	100	47
7823	0.00	0.00	0.00	0.00	0.00	0.00	0

47 candidates aggregated this series

0 candidates aggregated this series

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

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