OCR
RECOGNISING ACHIEVEMENT

GCE

Design & Technology

Advanced GCE **A2 H453**

Advanced Subsidiary GCE **AS H053**

Examiners' Reports

June 2011

HX53/R/11

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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.

OCR will not enter into any discussion or correspondence in connection with this report.

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Chief Examiner's Report to Centres

This was the second full assessment of the new specification and centres have embraced the new features of the courses; responding to INSET and to assessor reports to improve candidates' performance in a number of areas. Evaluation in F521/01; overall performance on F521/02 and Marketing Presentation and Reflection and Review in F523, had significant improvement from last year.

Some of the work seen was outstanding, representing the very best of Advanced Level design and technology. More candidates are demonstrating very high-level creativity and innovation in their work and presenting exciting and inspirational coursework to a professional standard.

There were a number of issues related to administration that centres are asked to address. It is vitally important that coursework moderation samples are submitted by the May 15th deadline and that all required documentation are included with the sample. The increasing use of downloaded interactive CSF mark sheets has helped to reduce the incidence of addition and transcription errors.

Centres generally prepare candidates well for F521 Advanced Innovation Challenge and there was a significant improvement in candidate performance on the F521/02 Reflection Paper. The Advanced Innovation Challenge booklet should have enough space for candidates to fully complete their challenge. If, in exceptional circumstances, additional supplementary sheets are used, they must be OCR supplied supplementary sheets and should be securely attached to the booklet.

Whilst most candidates provide excellent photographic evidence of their progress in the challenge, some photographs are unclear and did not always show full details, which can be detrimental to the candidate. This problem also occurs on F522: Product Study and F523: Design, Make and Evaluate. Care must be taken to ensure that the level of detail is shown in the quality of models, production methods and final outcomes.

An increasing number of candidates submitted exceptional coursework for Units F522: Product Study and F523: Design, Make and Evaluate. Some of the work represented the very best of professional Product Design practice.

A growing number of candidates submit their coursework as an e-portfolio, over one third of the candidates for this series. Most work makes best use of the extensive opportunities of using digital technologies to include real time video and audio clips and CAD.

It is important that centres check that the presentations run effectively and that they are not over large. Some candidates included large numbers of lengthy video clips, many of which did not really add value to the work. Clips need to be edited to ensure that only key information and relevant and focussed opinion is included.

Overall performance on F524/01 and F524/02 were very similar to last year. Resistant Materials was the most popular question option for F524/01, with Manufacturing, Graphic Products and Textiles the next most popular. There was an encouraging slight increase in the number of candidates attempting Question 1: Built Environment and Construction and Question 3: Food this year.

Some candidates appeared to attempt F524/02 questions that were outside of their area of expertise. Their responses did not include an understanding of appropriate, specific materials or the level of technical knowledge required to manufacture products.

It is helpful if the following reports are read in conjunction with the full specification and appropriate mark schemes.

F521 Advanced Innovation Challenge

General Comments

Administration

It is important that both examination papers are dispatched to the appointed examiner in one package as soon as the reflection paper has been completed on the date set by OCR. Candidates will have access to their challenge work booklets during session 2; however they are not to write in it.

Answers to the challenge must be completed in the challenge booklet, there is additional space in the booklet should candidates require it; however, the use of this space should be labelled carefully with the box number that the work relates to. Additional supplementary sheets should be avoided if possible and additional paper of any kind should not be stuck into the booklet. The front of the question paper indicates that additional paper will not be marked. There is also no need for candidates to stick models or samples of materials into the booklet, photographs, sketches and notes will be sufficient to communicate ideas to the examiner.

All materials relating to examinations sent from OCR to Centres will be dispatched to the examinations officer. It is important that colleagues check with the examinations officer that they have received all relevant and most up to date information prior to starting the challenge activity. Examination notices must be displayed in the area where the examination is to take place and an invigilator should be present. The teacher is there to read the instructions.

Running the Challenge

Centres are reminded that the role of the teacher is that of a facilitator and not that of a normal classroom teacher. They are there to provide access to modelling materials, monitor health and safety issues and read the teacher script to candidates, elaborating and explaining where this is indicated. Teachers must not:

- give advice to students about the design or manufacture of their product;
- cut materials to the correct shape or dimension for students.

It must be made clear to all candidates that this is an examination to assess the individual candidate's designing and modelling capability.

A number of candidates again approached the challenge with pre-conceived ideas and have failed to respond directly and creatively to the design challenges. It is not advisable to second-guess questions as this can hamper creativity. A few candidates misinterpret challenges, either because they do not read them with sufficient care or because they choose to base their work on practiced work to a design challenge. The themes for the examination are deliberately broad to give little opportunity to prepare specification points or ideas in advance of the examination to prevent over-preparation of candidates. Each challenge has two specific key areas that candidates will need to address fully with fresh innovative thinking.

It is the centres responsibility to provide a suitable range of modelling materials for candidates. It is not advisable for candidates to bring their own materials for modelling as this may hamper design thinking.

A 'job bag' should contain inspirational materials, images and information about materials, anthropometrics that could be useful when designing. Candidates must not share resources or job bags during this examination.

The quality of photographs is generally good but examiners have reported some problems with the photographs presented for assessment. These problems include; failing to focus on the object and photographs being printed at a size too large for the allocated positions within the workbook. Photographs must be stuck into the correct boxes in the booklet. It is important that the centre provides colour images of a good quality.

Centres are reminded that three photographs is the minimum required. Additional photos can be added to the workbook. This is particularly important if it is necessary to show other parts or views of an artefact or mechanisms to fully illustrate the final outcome. A small number of candidates did not stick photographs in the correct place. Photograph 1 is of modelling progress after first session, Photo 2 progress after the second session and Photo 3 the final model. Space in this area allows for an extra photograph of the final model if necessary to show detail or workings. More photographs can be included in the evaluation or progress report boxes.

Some candidates presented well annotated photographs, by producing a second print which they stuck into either the appropriate section of the workbook or into the 'additional space' and clearly labelled and then annotated. Candidates should be encouraged to stick photographs into the workbook as they are printed.

Security of Workbooks

Centres are reminded of the importance of appropriate security of all workbooks between the three sessions of the Innovation Challenge.

Work of Candidates

Again some highly creative work has been seen this series from candidates who have shown both design flair and sound technical knowledge. A significant part of the preparation for the exam should include techniques to allow the candidates to present ideas quickly and practice of workbook completion under timed conditions.

Very quick application of colour can enhance work but should not be used at the detriment of the level of detail. Use of 2D and 3D annotated sketching is sufficient.

Areas such as specification, evaluation of ideas and final products and the realisation continue to discriminate well between candidates. They are testing higher order thinking skills and these areas should be taught throughout the AS course.

In some Centres, candidates responded to F521/01 in a formulaic way. Pre-prepared work taken in as part of the job bag such as specifications and mind maps can result in candidates producing generic work rather than work that directly responds to the specific challenge.

The Challenge Assignment

Initial Thoughts

Candidates used a combination of text and drawings to explore the challenges within the theme of 'public spaces' and identified possible design areas/problems. Some candidates failed to think creatively about the challenge or context and suggested only very predictable responses. Many candidates explored ideas in depth; thinking creatively, whilst considering the indoor or outdoor environment, users and space they were designing for. The better responses show greater creative thought as well as consideration of how/when/where and who by the product may be used. A number of candidates did not fully engage with the challenges set, missing one or both of the two key points.

Design Brief

Candidates should be encouraged to write clear and precise design briefs that develop the design challenge further and offer scope for creativity. The majority of candidates identified the appropriate user groups for their products.

Specification

The more successful responses were where candidates concentrated their thinking on the functional and user needs of the product in the design situation and ensured that the relevance of all points were explained. Generic specification points can only gain credit if they are made relevant to the question and answered through specific references to the situation and theme. Careful justification of points is needed. A significant number of candidates continue to produce specification points that lack justification. Specific detail is required for high marks in this section, eg weight, size and material properties.

Ideas

Initial ideas on the whole were good, with some excellent examples of innovative thinking, and good use of annotation and sketching. Higher performing candidates produced a range of functionally different creative ideas that clearly related to their specification, situation and the potential users. Originality and creativity are key aspects of the criteria. Fewer candidates just presented one idea in this section compared to previous series.

Candidates used a combination of drawings, text, annotation and occasionally modelling/photographs to show their ideas. Higher performing candidates gave different views of objects or parts of objects and clearly communicated their creative design thinking and included specific detail of materials and manufacture/constructional techniques. Other candidates needed to include more details of specific materials and manufacturing techniques that could be used for the product, although there was an improvement seen since the last session.

An improvement was also seen in this session for the evaluation section with good evaluative annotation in the designing section. Where evaluations were poor, candidates had not explained why they took the idea forward and why others were rejected. Quite often strengths of ideas were discussed with no mention of disadvantages.

Reference to source of inspiration/job bag was usually given although not always with pictures. The better examples of evidence from job bags were where candidates had collected a very broad range of items and took their inspiration from unrelated inspirational objects. Candidates should be advised against copying or presenting existing solutions as their ideas. ‘

Listening to and responding to the feedback given by peers has improved this series with many candidates having a clear structure to box 10 showing comments/ thoughts/ modifications.

Development of Ideas

There has been some improvement in this section, most candidates using notes or annotations to show how they developed and improved their design towards an optimum solution that satisfied the design brief, specification and needs of the user. Candidates are also expected to show consideration of materials and components and to consider methods of manufacture for their product. Most candidates were able to suggest materials for construction, however generic terms such as ‘wood’, ‘plastic’ or ‘card’ should be avoided.

Candidates will have information in their job bags about suitable materials and specific names and details are expected; candidates should be encouraged to consider and explain their choice of materials. It should be remembered that in this section the materials and construction are those that would be used for the product should it be manufactured commercially and not those that would be used in the workshop or for the model making.

It is also expected in this section that the size of the product is considered. Dimensions of individual features, components and/or thicknesses of materials are considered by the more able candidates. Candidates should be advised against modelling extensively at this stage of the challenge. Usually this is not successful because there is insufficient time in which to consider the practicalities of the real product.

Plan for Modelling

Action plans were good with lists of materials and action plans ranging from basic statements to ones that included time schedules/flow charts and annotated sketches of how model would be constructed.

Recording Progress and Modelling

Some candidates gave only brief statements in their progress reports with no real detail to show examiners what modifications / amendments or successes had been made. Those who have used extra photos or sketches of details of their models tended to complete these boxes more successfully.

Most centres had a better understanding of the type of models required although many candidates concentrated exclusively on the aesthetics of their design ignoring any functional detail (eg folding mechanisms). There were some excellent examples of models with candidates using appropriate modelling materials which enabled them to fully reflect their design. Candidates need to be able to develop their quicker modelling skills using a variety of materials. Creative use of common inexpensive materials is probably the easiest way for candidates to score well in this section. Kits should not be used for final models as it restricts the candidate's ability to model their design accurately and skilfully; as does the use of existing products to form part of, or most of their model. The use of collected materials should also be avoided (loo rolls, cereal boxes, plastic bottles). The use of skills section cannot be highly marked if candidates have just stuck together collected items to form a model.

Evaluation

Some improvement was seen this series for the evaluation section. There is evidence of centres instructing candidates to structure the section as 'S and W', 'Evaluation' and 'Modifications'. This is usually a successful approach. Many candidates needed to develop more detailed evaluations recording their modifications in sufficient detail and indicating possible weaknesses of their product.

Comments on Individual Challenges

Generally the most popular questions were the temporary partition, seating, litter and play area, challenges five, one, two and three. Responses to most questions were similar in quality, with all questions allowing scope for creativity.

Challenge One: Temporary partitioning for an indoor space.

This question was quite popular. Although some creative responses, many candidates went for relatively practical solutions demonstrating limited creativity. Some candidates designed partitions for outdoor spaces failing to read the challenge carefully. Most candidates addressed the need for a product to take up minimal storage when not in use.

Challenge Two: Recycling drinks packages.

This challenge was very popular. Many lost the reference to drinks packaging and designed general waste bins. There was a wide range of creative responses to this question from bins and crushers to personal litter collection devices to be carried by an individual. Most only considered the needs of the user, who was disposing of litter, rarely was the method of emptying the bin mentioned. Good consideration of the users' needs and safety were evident in most responses.

Challenge Three: Children's Play area to encourage physically active play.

This question was again quite popular. Pirate ships being a common theme perhaps due to forthcoming film releases. Innovative responses were seen with good consideration of physically active play and safety.

Challenge Four: A product to be sold on a stall to promote seasonal produce.

This challenge was not as popular as some others. This was most commonly answered by textiles candidates, who chose to design something that would appeal to 16 – 25 yr old women.

Challenge Five: Outdoor eating area for a local Cafe.

A very popular choice of challenge. Often little or no reference was made to the café or eating – folding seats tables very similar to those seen in previous challenges. A varied response with some highly creative responses were presented. Most popular responses were for seating or a sheltered area.

Challenge Six: A product for a charity to encourage people to make donations that should appeal to one or more of the five senses.

This challenge was not as popular as some others. Some candidates interpreted this as some form of collection box, others as a product that could be sold or worn to raise funds for the charity. All valid interpretations potentially leading to good creative solutions.

Reflection Paper

Many candidates produced more focussed responses and addressed the bullet points; accessing the full mark range available. Others needed to focus more fully on the product they had designed. It is evident that the more successful candidates are planning their answers ensuring all bullet points are addressed in relation to the topic of the question. Not all candidates supported the points fully with specific examples in reference to their product.

It should be noted that it is stated in the specification; "candidates have the opportunity to reflect on the challenge by answering questions that require them to consider their product. These will be derived from a design, manufacturing or marketing perspective, including: sustainability and the environment; product life; social, moral and cultural issues; environmental issues; inclusive design; the human interface; aesthetics; scale of production; production technologies; fashion; marketing; commercial issues." These areas should be taught through the 'AS' course, and students should learn to apply knowledge to products when evaluating and analysing. Candidates should be familiar with technical terms related to these topics.

Question 1

This was generally well answered with most candidates having an understanding of some ethical issues – the majority focussed on improving the environmental issues associated with their products, some however did become repetitive and failed to appreciate the wider ethical issues associated with their products. Typical issues that could be covered were material selection and associated ethics and moral issues eg mining – impact on land clearing and conditions of workers etc. Environmental impact in use and of materials/attraction, obsolescence issues, energy used in production, life expectancy, disposal. Social issues, cultural or inclusive design. Modifications could include use of recyclable components/materials, fair trade, recycling issues. Six Rs – rethink, reuse, recycle, repair, reduce, and refuse. Ethically sourced materials and goods, fair trade etc

Generally fewer candidates achieved the marks for the final bullet point about economic implications of the ethical improvements – most candidates said costs would rise but failed to explain why.

Question 2

The majority of candidates were able to explain suitable ways in which the market for their products could be targeted and market research that could be carried out. Where candidates scored less marks, it was generally because they had failed to appreciate who their product would be marketed to and instead focussed on the users of the product eg cafe customers rather than the cafe owners.

Many candidates were able to make product comparisons and methods of targeting used by other companies were considered; as were cconsumer needs, product placement, pricing, promotions – BOGOF, trade fairs, publicity campaigns, personal selling, and advertising methods. The important factor was the choice of the right marketing and marketing research techniques for the product, in some cases the market would be the Café owners, the local Council or the Charity rather than the specific users.

A significant number did not relate their discussion to the preparation of a marketing strategy; they described in detail techniques of market research as it might be conducted prior to designing the product (focus groups, questionnaires to establish likes and dislikes etc) but did not relate this to the marketing of their completed product in any way.

It should be noted that candidates should read each bullet point carefully and address each to ensure access to the full range of marks.

F522 Product Study

General Comments

This Unit has now run for three substantive June series and there is a growing awareness of the ethos of the Product Study and the requirement for 'real time digital images' and 'interactive dialogue' to record all work and developments as events actually take place. Another essential requirement is to utilise 'interactive dialogue' – this means to discuss developments with others, again in 'real time' and then respond to comments made in a constructive way. Sampling of portfolios round the top grade boundary show that candidates presented work on A3 or CD in approximately equal numbers. At the lower grade boundary the picture is more unbalanced with twice as many candidates producing A3 portfolios compared to CD.

The choice of presentation media is a decision for centres and candidates whilst considering the logistics of computer access within the centre. As the above examples show it is possible to achieve the top grade bands with either presentation method. Centres however do need to advise candidates that the assessment criteria must be met whichever decision is made and in particular that there is a mandatory requirement for real time digital images and interactive dialogue. The OCR preferred option is for candidates to present work on CD where it is easier to embed real time images and associated videos and voice clips to meet the above requirement. Moderation was aided by Centres who followed guidelines and saved files in Power Point 2003 using the 'pack and go' or 'package for CD' facility. Moderators did experience some problems from a very small minority of centres who do not use this format. Some files are impossible to open and some videos do not work. Centres are encouraged to try their e-portfolios on an independent XP computer to ensure that both the Power Point and videos run successfully. In extreme cases where this is not the case OCR will return work to centres and request that it is re-formatted.

Successful candidates using A3 paper portfolios achieved the requirement for real time evidence by a variety of means including high quality digital photographs and real time notes and observations added either directly on development sheets, as overlays or on 'post it' stickers. The evidence from the lower band showed that more candidates used A3 than CD to present work and that 'interactive dialogue' in particular was limited. Centres need to be more rigorous in differentiating marks and award marks in the appropriate bands when evidence is not presented.

Experience from this moderation series indicated that at the top end marking is generally slightly too generous and that marks in the middle band would sometimes be more appropriate than the top band. At the bottom end the over marking by some centres is more obvious and care should be taken not to over-reward suboptimal work. AS should demonstrate one year's progression from GCSE standard. A mark at the top end of the lower band generally represents a standard that equates to a bare pass at AS level. Some work seen this series, especially in the 'creative ideas' section of the development assessment criteria would have been more appropriately placed at the lower end of the bottom band and centres are urged to try and differentiate their marks objectively when considering work of this standard.

The administration and management of this session was generally of a good standard aided by increased use of the downloaded interactive CSF mark sheet, which dramatically reduced addition and transcription errors. Most centres acted promptly if errors were found and most samples were received by the deadline. Some work was received ahead of the deadline where the samples consisted of all candidates in the centre. Consortia arrangements are more complex, centres need to be certain that they have correctly registered all centres involved and then wait for the official sample request.

The report by section which follows, identifies some appropriate ways that real time evidence could support the requirements of the assessment criteria.

Section by section guidance on Product Study requirements for Unit F522

This product study should take candidates 30 hours to earn up to 120 marks.
(1 hours work is notionally 4 marks)
OCR recommended A3 /PP allocations are indicated for each section

Product focus and analysis (8 marks 2 x A3/PP)

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.

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

- Detailed description of the intended purpose of **one single selected named** product (not a range).
- Key Criteria used in the design of the product.
- The needs of the manufacturer. (This is often the weakest section!)
- The needs of the consumer.
- Better candidates awarded marks in the top band showed a clear photograph or video clip of their single selected product being used. Many centres are encouraging this approach with their candidates to very good effect.
- Real time digital images' are required which show the single selected named product in use. Not all candidates did this and this continues to be a problem with some candidates submitting work as A3 portfolios.
- 'Interactive dialogue' should be used to identify product features – this means talk about the product with others and record observations in real time-as it actually happens. This was again a major omission in the majority of candidates submitting work this series.
- Those submitting work on CD have the opportunity to discuss their product and present real time evidence as a video or sound bite.
- Asking the views of third parties and recording their responses was a feature of some excellent projects this series.
- It is absolutely essential that those candidates who enter their work as A3 portfolios engage in the same academic activity as those who submit E-Portfolios. Overlay sheets, directly written comments or 'post it' stickers can be used to good effect to record the views of others.
- Candidates who do not present real time evidence and interactive dialogue cannot access the top mark band.

Strengths and weaknesses comparison (12) (2x A3/PP)

Candidates should be encouraged to show evidence of actually using a range of products, which are compared with the selected product; a 'hands on' approach is required. Where products are not experienced first hand centres should consider awarding marks in the lower bands.

For marks in the top band the following should be addressed: function, suitability of materials and manufacturing processes, ergonomics, aesthetics and cost.

- Real time digital images' should show the strengths and weaknesses of the single selected product and also comparative products. The actual selected product should be used and shown in use.
- Comparative products should be shown in use – in real time.
- 'Interactive dialogue' should be used to discuss relative merits of products with others and recorded using video, sound bites, or written comment.

Moral Implications (8) (1 x A3/PP)

Identify and analyse the moral implications associated with environmental, social and economic issues in the design and use of the product.

This section is often presented in a dry academic form. Some inspirational work has included videos of ethical debates, which explore moral issues. Very few candidates achieved marks at the top end of the top band. Visiting speakers were used to very good effect in some centres.

Brief and specification for improving the product (8 1 x A3/PP)

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 reported that many candidates are still trying to improve too many aspects of their selected product.

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.

- Some candidates have successfully enhanced this section with real time evidence of the feature to be improved.

Development of improvement (56 10 x A3/PP)

Present a wide range of innovative/creative initial ideas, which demonstrate a high level of development using high quality annotated sketching, real time digital images and interactive dialogue. (14 marks)

Integrate this with real time evidence of a wide range of appropriate prototype models. (36 marks)

Evaluate ideas against the specification in real time and justify the choice of one idea worthy of being taken forward. (6 marks)

This section relies on the integration of these three requirements for successful completion. There is a very large allocation of marks for this assessment criterion; this is deliberate as it was considered during development that this is where the majority of candidates would choose to spend their time and energies. As there will be many different approaches to this section appropriate to different focus areas It might be helpful to consider that the expectation in relation the notional guideline of 4 marks per hour means that candidates should devote 14 hours to this section.

The new CSF F522 form made the task of accurately awarding marks in the three bands easier this series.. Marks were generally consistent for the prototype modelling and ongoing evaluation sections. The first section relating to innovative and creative ideas which are annotated was often over marked. In the lower band some very poor work, which reflected little or no development from GCSE standard, was inappropriately awarded marks by centres reflecting a pass at AS level. Very poor work should be marked at the lower end of the bottom band and not at the middle or top.

Testing of final developed idea (12 marks 2 x A3/PP)

Moderators reported the growing trend of small – sample questionnaires relying heavily on friends and colleagues, weaker candidates often present these with no real time responses. More successful surveys involved third party views from external specialist sources, or a broad range of users. There are a variety of ways to meet this assessment requirement, which will differ depending on the area of focus for the product development. Candidates should however note the need to plan a formal test.

- Real time evidence of the formal test situation is a good feature of many successful projects.

Produce a summary of the results of the product development with detailed analysis of how the prototypes and final tests contributed to establishing the validity of the chosen idea.
Present one further improvement in detail. (8 marks 2 x A3/PP)

In addition to the presentation of the final test results, Candidates should summarise the results of their prototyping and suggest one 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 showed a clear annotated sketch of a further improvement. Analysis of results is also a more complex matter than simply stating results in a table.

Communication (8 marks)

Use a wide range of high quality text, graphical techniques, digital technology, and interactive dialogue as appropriate to present information. (8 marks All 20 A3 sheets)

- The use of 'real time digital images ' is mandatory- they have to be used to record evidence of work as it actually happens. Some centres provide really high quality photographs.
- OCR is encouraging the use of short video clips, with sound bites (interactive dialogue) recorded as part of an E-Portfolio on a CD.
- If the preferred option is to continue to use a paper portfolio – Digital photographs must be used and interactive dialogue must be presented in alternative forms, which show positive response to opinions from others. Overlay sheets could provide an opportunity for comment without affecting the quality of candidate presentation. Work with no interactive dialogue should not be marked in the top band.
- The communication assessment criteria apply to all sections of the Product Study.
- Candidates should not over-enhance the background of design sheets.
- The use of Arial 10 pt (min) should be encouraged.
- Prototype modelling should be fully integrated in to the development of creative ideas and ongoing evaluation. Different focus areas should respond with an appropriate balance of prototyping, which suits the development of improvement for their selected product.
- It is important that all focus areas do respond with presenting an appropriate range of prototyped developments. <u>One single 'final prototype' is not within the overall ethos of the specification.</u>
- Some centres submitted the work of all of their candidates in a form which could not be accessed with the equipment which most moderators use. It is essential that all individual CDs are trialled on an independent XP laptop to ensure that all video clips and sound files have been correctly transferred to the file. Candidates should be discouraged from using files flash drives or files from I pods, I tunes, and mobile phones if they are not compatible with a standard PP presentation.
- Large file sizes should be discouraged, complex work which takes a considerable time to load and view could actually detract from the content, it is possible that over complexity could lead to a mark in a lower band. The most successful work was presented clearly and simply in 20 slides or pages.

F523 Design, Make and Evaluate

General Comments

Administration

Arithmetic errors on the CSF form were common; a significant number of candidates' folders or CDs were not clearly labelled with Centre Number and Candidate Number and many samples were received after the deadline this series. Centres are asked to check all documentation before forwarding to the Moderator, and to respond promptly should any queries arise. OCR Interchange is the means of online communication between Centre Examinations Officers, OCR, and Moderators. Whilst this was effective in most cases, some centres did not respond to email communications from Moderators sent through the Interchange system. Centres are reminded that moderation cannot take place until the Moderator has all relevant documentation in their possession. Where there are ten or fewer candidates, OCR instructions require the centre to send the complete work of all candidates to the Moderator by the due date, and not to wait for any communication from the Moderator.

The grid provided as part of the CSF form for centres to provide a breakdown of marks from the 57 available in Section 4a was completed and forwarded to the Moderator in the majority of cases, sometimes following a request from the Moderator. In most cases it was used sensibly with the positioning of marks clearly related to the evidence in the folder. In a few cases it was difficult to see the relationship between the evidence in the folder and the relative positions of the marks for level of competency in each of the criteria. Centres are asked to note that a revised CSF form, incorporating detailed instruction and guidance will be operational from the January 2012 series onwards.

Choices of project

Candidates had chosen a range of coursework titles that were appropriate to the requirements of the examination. The majority were 'Resistant Materials' based, with Graphic Products, Textiles, Systems and Control, Engineering, Food, Built Environment and Construction, and Manufacturing based projects following in decreasing numbers.

There was a high percentage of 'routine' projects which led to 'standard' and 'familiar' solutions, but a great number of centres and candidates did take on board the broader ethos of the new Specification to venture outside the comfort of a 'normal' project and tackle challenging (often unusual) design problems, exploring and developing innovative solutions. Centres who guided and prompted candidates into 'real life' contexts and situations as the basis for their coursework resulted in some outstanding work and genuine client needs being satisfied by working products. Moderators expressed some concern where centres had issued a theme (eg educational toy) for all of their candidates. This is not in the true spirit of Product Design at Advanced Level and tended to stifle creativity and innovation.

In a significant number of cases the overall complexity of the projects as executed and the range and/or depth of skills involved in the design development, making and evaluating was insufficient for candidates to attain the marks awarded by the Centre when compared with OCR's benchmarking examples. In some cases very large adjustments were necessary to bring the Centres assessments into line with the OCR standard.

Published OCR resources and training materials for this Unit have included comprehensive guidance and advice concerning the choice of project. It is of paramount importance, and should arise from careful consideration of the opportunities it presents to address the

Assessment Criteria for this Unit, and the potential it offers for the candidate to demonstrate their ability.

Accuracy of Centres' assessments

Centres' assessments tended to be lenient; some significantly so, with adjustments to marks being required in many cases to bring Centres' marks into line with the OCR standard.

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.

Large adjustments were often needed where project work lacked the level of difficulty and challenge required at Advanced Level, especially in the higher mark range where candidates completing very simple outcomes in just a few hours had been rewarded with very high marks. Centres who had fully familiarised themselves with the guidance materials and exemplified standards were able to accurately mark their candidates' work, similarly those who had noted the feedback and reporting to centres following the June 2010 series.

Nature and quality of candidates' work

Overall, a more structured approach to the assessment criteria was evident. However, candidates' responses often indicated that a centres and teachers had made limited reference to either the communications to centres following previous series or to the OCR-endorsed textbook where specific guidance is provided for each section.

Following the flexible approach encouraged in the new specification a number of innovative solutions were developed. Some projects, often because of their size, were incomplete or not finished to an appropriate level of detail and quality. However, projects were, in the main, focused and sensibly scaled.

The spread and overall standard of the work was slightly higher than the first series of this Unit in June 2010, as centres had followed feedback and advice particularly relating to the 'Marketing' and 'Review and Reflection' sections. In the main, centres had tried to allow more time for these sections after their experience in the first session.

There was limited reference to the commercial and marketing aspects of design and manufacture throughout the project, although there were more genuine client-based projects and there was greater evidence of contact with clients and potential users throughout the coursework.

ICT

Highly developed skills in a wide range of applications using ICT, CAD and CAM were seen, and Moderators noted the professional standard of work presented by some candidates. A number of candidates did not provide evidence of CAD, and Centres should note that although this is no longer a specific named requirement in the Assessment Criteria, it is nevertheless a reasonable expectation if high marks are to be supported.

The downloading of large sections of text and images from the Internet is of limited benefit at this level and a more personal and interactive analysis of data and products is recommended.

E-portfolios

Approximately one third of the candidates entered for this Unit used PowerPoint software to record and present their coursework as an electronic portfolio.

As part of their e-portfolios, many candidates used video clips effectively to capture ongoing evaluation. This led to a more fluent communication of the design/development process. When used appropriately, such clips made the folios more engaging and easier to follow.

In some cases, the Moderator encountered difficulties, and the following issues in particular were raised this series.

- Lengthy audio and video clips are unnecessary since a short clip gives sufficient evidence for the Moderator to confirm the level of thinking of the candidate. In some cases presentations included more than 30 clips, which under normal circumstances was excessive.
- In some cases, videos in the PowerPoint presentations would not run when 'clicked', mostly where the actual video file had not been included on the CD. When saving to send to the Moderator, 'Pack and Go' must be used (or 'Package for CD' in PPT 2007). This creates a folder in which the main PPT file is saved along with all the associated files, video clips, and links, etc. That folder is what is sent to the Moderator on CD.
- In some cases, a 'marketing' video was sent as a separate file, but was not identified as such. It is important that the PowerPoint references, clearly identifies and links to all associated files. If this is not the case, key work to be moderated may be missed by the Moderator.
- Centres are asked to note that PowerPoint is the only approved format, and that WORD file format is not acceptable.
- Wherever possible, centres are asked to submit candidates' coursework as e-portfolios. It is acceptable to send the complete sample of all candidates' work on one CD / DVD, provided the work of each candidate is contained within a file folder clearly indicating candidate name and number. Where candidates have completed all of their work in an electronic format, this will save considerable printing and postage costs.
- The use of sophisticated 'Title Pages' on a CD/DVD, and complex indexing and navigational hyperlinks within PowerPoint presentations can present problems. It is important that the Moderator can locate and open any candidates' work in any order.

Support and training for the teaching of this Unit

Further guidance for this Unit will be given at the OCR Training Courses during 2011-12. Visit www.ocr.org.uk/training for more details.

Comments on Individual Sections

1 DESIGN BRIEF 3 marks
Present a design brief for a marketable product

Four key areas need to be addressed in this section for maximum marks to be possible:

- Brief details of the CONTEXT – the situation, the problems, the need……
- A clear and precise BRIEF
  What will the candidate actually be designing, making and evaluating?
- Clear reference to MARKETING
  Details of the target market / client
  What aspects of design and manufacture are important if this product is to be marketable?
- Reference to KEY ISSUES that will be important during the designing.

Most candidates presented a clear brief for the designing, although reference to marketing issues and marketing potential was not always evident. Identification or profiling a specific named client or target user group needed to feature more prominently in responses – those for whom the item would be produced.

Many candidates had decided in advance many details of the product they were going to design and make, and this tended to constrain their thinking and designing right from the start. An open-minded approach: where a problem is identified, information gained in consultation with client or target market and appropriate solutions proposed, is needed. The marking of this section tended to be lenient when compared with the OCR standard.

2 INFORMATION, INSPIRATION and INFLUENCES 9 marks
Obtain information relevant to the design of the product
Present a range of evidence to show the sources of inspiration and influences on the designing

The absence of key information such as details and dimensions of items to be stored or fitted into the product, details of the intended location for the product, or the legal guidelines or regulations which apply to their product, was prevalent in this section. This is key information; 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 clearly identified, analysed and presented by candidates in this section. Consideration of cost is a significant factor when designing marketable products, yet this aspect was rarely covered.
Very high marks were frequently given when there was no primary research or 'personal-contact' investigation and little inspiration derived from the evidence. This resulted in centres' marks being lenient in most cases in this section. For marks to enter the top mark band (7-9 marks) there must be clear evidence of:

- personal contact (person to person, not via email or letter etc) with a client or representation of the target market
- AND/OR
- personal contact with existing / similar products (the actual products – not internet image, photograph, etc.)

Similarly, quantitative and technical data such as measurements, capacities, weights, and timings, are necessary if high marks are to be awarded.

This section continued to include a great deal of irrelevant or generic information from some candidates, and information that was relevant but was not subsequently referred to in Section 4. However, it was pleasing to note fewer cases of candidates 'throwing everything in' this section, as they selectively included more relevant information and data to guide their designing.

A significant number of candidates did not benefit from the opinions and experience of clients or experts. Candidates who focused on the core information and influences to be considered (existing products, client interviews, necessary measurements etc) faired better in terms of both the marks gained and the suitability of the final product outcome.

Overall, a more positive approach to this section is encouraged, where the research carried out by candidates is seen as necessary and important to directly influence the designing in Section 4. As mentioned above, many candidates had decided in advance the details of their product, and this tended to limit their openness to the important influences and constraints that needed to be considered in their designing.

3 DESIGN SPECIFICATION 3 marks
Produce a design specification for the product

For the highest mark to be awarded in this section, candidates must state detailed requirements by reference to specific aspects of the product, including technical, numerical, measurable targets. This will include sizes (eg maximum or minimum / range of adjustments, positions), capacities, weights, quantities, nutritional values, costs/budgets, performance, life span, and features required, wherever possible.

The nature and purpose of a Design Specification was not always clearly understood. Specification points were very often not substantiated by evidence in Section 2, and fundamental functional requirements of the product were frequently ignored whilst points covering aspects such as sustainability, moral issues, and cost were covered in (questionable) detail.

Candidates' responses mostly fitted the descriptor for the middle assessment box, with very few candidates scoring full marks. Centres' assessments in this section were broadly in line with the OCR standard.

4a DESIGN, DESIGN DEVELOPMENT and MAKING 57 marks
Demonstrate competence in the design, design development and making of the product, to include the following package of evidence:

- **the generation and exploration of design possibilities**
- **the use of digital technologies**
- **experimenting and modelling**
- **the refining and defining of a final design through ongoing evaluation, and**
- **the planning and making of the product**

Pages 53-54 of the Specification: 5.11 Coursework Administration/Regulations, state *'The intention is that assessment of the coursework project should not restrict, interrupt, or influence the natural flow and progression of the candidate's design, development and making of a product to meet a need. The assessment criteria should be seen as providing a framework for assessing the candidate's approach to key elements in that process, the appropriateness, depth and quality of their work, and the level of thinking shown. It is important that assessment does not interfere with the candidate developing and using skills naturally and instinctively, guided by the teacher…..'*

The assessment criteria for this section allow for flexibility of approach. Candidates are not limited or constrained to a prescribed approach. The package of evidence of the candidates work in this section should include evidence against all five key areas listed above. However, the balance and emphasis of work in these sub-sections will vary considerably between projects, particularly between material focus areas. Different types of products will involve different weightings of the five sub-sections. The overall mark should represent the 'best-fit' mark considering the skills required for that particular project. Some products will require extensive modelling and trials to arrive at a highly suitable outcome, for example food products. Other products may require less modelling but demonstrate high-level demanding making skills in the final product. Consideration of this should take place when determining the 'best –fit' mark in this section, where a professional judgement of the intellectual demand involved in the designing and making of the chosen product is crucial to ensure a fair and accurate mark. Centres should note that a revised CSF form will be operational from the January 2012 series onwards. This will incorporate detailed instructions and guidance for the assessment of competency levels in this section.

The overall sophistication, difficulty, and intellectual challenge involved in the designing and making will influence marks in this section. A simpler project will need to be carried out in greater depth to achieve the same marks as a more complex project.

In general, candidates displayed an integrated approach to designing, with freehand sketches, 2D and 3D modelling including computer modelling and evaluative commentary used to communicate design thinking and a progression of design. Some candidates made regular contact with their client / target user group whilst working in this section, and in so doing were able to justify decision making more clearly.

In some cases centres had awarded marks in the higher band in this section where the designing and making tasks were not sufficiently demanding at A2 level. Products varied from those that were highly imaginative and of a professional quality and finish, showing real flair and creativity, to those that were more appropriate to GCSE coursework. In many cases the designs and the methods employed in the making of the product were very simple, sometimes crude, yet were awarded high marks by the centre.

In a number of cases there was limited photographic evidence of the manufacturing of the product and the processes involved. In some cases the images were too small to show the detail required. The allocation of two pages or slides is recommended, with the inclusion of several large photographs.

In many cases, centres' marking in this section was

- **the generation and exploration of design possibilities**

Most candidates produced a useful range of initial design possibilities, although some showed little innovation or exploration and were based on fairly obvious commercially available designs. In a significant number of cases, a more thorough development phase (to expand and confirm design detailing) was needed rather than the massive jump from a chosen design concept to final chosen product.

In the best examples, Moderators saw mature, fluent, and open-minded approaches. Innovative and creative designs being explored and developed through an integration of freehand sketching with informative annotation, CAD drawings, images and modelling, and 3D modelling and trials. Candidates often included images of existing products or other forms that had inspired the designs. The work of some candidates was impressive indeed and was a delight to moderate.

There was a considerable difference in intellectual demand between projects. Candidates choosing very simple products with little complexity must be aware that considerable design exploration and detail will be needed if their work is to achieve high marks. Greater attention to technical aspects would improve candidates' performance, as would consideration of marketing aspects such as packaging, along with wider consideration of commercial and manufacturing issues.

Centres' assessments of the level of competency demonstrated by candidates in this section again tended to be lenient.

- **the use of digital technologies**

The use of relevant digital technology such as photography, scanning, and CAD continues to develop and increase, as does the use of videos in e-portfolios. At the highest level, candidates used stress analysis features in CAD software to model structural elements of their Engineering design proposals to optimise strength properties against size and weight. Others used image manipulation software to explore and refine their Graphic Products designs. CAM was often used in the modelling and making processes, with candidates usually presenting appropriate evidence to support the centre assessments. The quality of photographic images was poor in some cases, and this does need to be addressed to ensure accurate assessments of candidate competency in all aspects of designing and making are possible.

The extensive, often relentless, use of laser cutters and 3D modelling / rapid prototyping facilities was sometimes carried out at the expense of other equally sensible skills and techniques. In this Unit as a whole, Moderators are expecting to see the best and most appropriate use of equipment and facilities rather than just total use of the new.

In general, centres appropriately assessed the level of competency demonstrated by candidates in this section.

- **experimenting and modelling**

Candidates used experimentation, trials, visualisations and simulations in an integrated way to test design possibilities, to explore different concepts and design details, and to aid the development and refinement of their designs. To raise attainment, candidates are encouraged to further expand their design development through modelling and experimenting.

A variety of modelling materials were used appropriately, and laser cutting and engraving CAM equipment was widely used to produce a range of models. Photographic evidence in this section was sometimes poor, with blurred images in some folios.
Centre's assessments of the level of competency demonstrated by candidates in this section tended to be lenient.

- **the refining and defining of a final design through ongoing evaluation**

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

The competency of candidates in this section was often over-rewarded. In a number of cases there was no definition of the final design solution. For high marks, a clearly defined final design is required, which, if it was sent to a distant manufacturer, would enable that manufacturer to produce the item exactly as intended. CAD working drawings with supporting annotations are appropriate. Whilst some responses were to a high standard of detail and complexity, CAD drawings were most often incomplete and lacked the detail that would have enabled a third party to manufacture the product. In such cases, a mark in the lower or middle band is appropriate.

Moderators noted a general lack of appropriate and productive ongoing evaluation. In many cases there was very little evaluation with descriptive and factual annotation present only. The real time evaluation of design development in the form of evaluative notes and comments alongside ideas, sketches and models is encouraged. Reference to the requirements in the Specification is important.

Candidates submitting e-portfolios were able to use video and audio clips to advantage in this section, and the use of such improved this session.

- **the planning and making of the product**

Most but not all candidates addressed the requirement for planning with sensible plans and time issues. Some produced Gannt charts or several pages of manufacturing planning, which provided more evidence than necessary. In many cases, planning was more of a retrospective log or diary of making in the case of most candidates.

There was a wide variety in the quality and scope of products. Centres' assessments were sometimes extremely generous with very high marks awarded to well finished but undemanding products. Relatively straightforward and simple products may sometimes be

balanced by more demanding or complex supporting design and development work in the package of evidence presented for Section 4a, but this was not often the case. On the whole, centres' marking was lenient when compared with the OCR standard.

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

Photographic evidence to support centre's assessments in this section needs to be improved. It is important that candidates' skills, and the quality of their practical work are clear. Moderators expressed concerns over the quality of photographs, where assembly and constructional details were often obscure, and the quality of finish was not evident. There is no substitute for 'real time' images – 'over-all' and 'close-up'.

4b INNOVATION 15 marks
Show innovation

The influence of the AS level Unit F521 Advanced Innovation Challenge was clear, with candidates increasingly including and exploring innovative features in their designing. A more fluent and confident expression of creative design possibilities was evident in many cases.

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

In a few cases, centres had awarded a mark in the top mark band, alongside marks in the bottom band in every other section of this Unit. Although this is not an impossible scenario, only in rare cases might high marks be justified in this section alongside much lower marks in other sections. Marks are normally expected to be *'proportionate'* to marks in other sections. An assessment of the innovation shown will be influenced by the overall complexity, challenge, and level of difficulty involved in the project as a whole.

5 TESTING and INDEPENDENT EVALUATION of the FINAL PRODUCT 9 marks
Show evidence of the testing of the final product against the specification
Identify and state strengths and weaknesses in the product
Respond to independent evaluation

This section and Sections 6 and 7 follow the making of the product. They account for 27.5% of the total marks for this Unit. In many cases it was evident by the quality of responses compared to earlier sections that candidates had left insufficient time to complete these three final sections adequately.

There are three clear requirements for candidates' responses if they are to satisfy the assessment objective:

- TESTING to the Specification
- STRENGTHS and WEAKNESSES
- INDEPENDENT EVALUATION

For the highest mark to be awarded, all three elements need to be covered thoroughly and in depth. In many cases the Moderator was unable to confirm high marks awarded by the centre where candidates had not clearly addressed all three requirements.

Responses tended to be very subjective, and testing was often superficial with few candidates planning a proper strategy to assess the suitability or performance of their product in its intended situation by its intended user (this clearly needs to be given consideration during earlier stages of the project). In a number of cases, the candidate made no reference at all to the Design Specification, the specific targets against which the success of the final product should be measured.

There was usually an emphasis on the strengths and successes of the product and most often little acknowledgement of the (sometimes very obvious) weaknesses. Where candidates had identified shortcomings of their product, most went on to suggest modifications and improvements.

In the best responses, candidates went back to clients and obtained detailed feedback. The use of video or quality digital photography by some candidates was truly excellent. It was clear that some centres had made a real attempt to get the right people to look at the work and to evaluate it in depth.

Overall, the responses by candidates to comments made by others were weak. Responses should show clearly how specific issues raised would be addressed. Aspects of design or manufacture could be changed, components or ingredients modified, and ideally further tests then carried out to establish their success or otherwise.

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

6 MARKETING PRESENTATION 15 marks
Using appropriate techniques create a marketing presentation suitable for the final product

Responses were much improved this series, with centres and candidates generally being better prepared and allowing more time. A wide range of impressive marketing strategies and presentations had been produced. Centres have embraced this 'new' area quickly and students clearly enjoyed working on it.

There were some excellent presentations, often of professional-quality, with candidates producing quite sophisticated discussions of marketing strategies and worked-through examples of advertisements or marketing presentations for their product. These sometimes included videos or PowerPoint presentations showing the product in action, live online websites with product options and accessories, and a business plan for the company selling the product and future derivatives. Digital techniques were widely used to produce appropriate ways of engaging the target market.

A few candidates had gone as far as producing the packaging for their product, placing it in a shop display and then gaining feedback from potential customers. At the other end of the scale candidates included simplistic and unrealistic suggestions with little detail or value, often simply producing a collage of existing advertisements that would be appropriate for their own product. In some cases, candidates listed general marketing principles but made little reference to their actual product.

It is recommended that centres make the teaching of the principles of marketing a higher priority. In a significant number of cases candidates were unable to show an understanding or application of the basic aspects of product distribution, selling, and promotion.

Specific marketing aspects needing consideration in this section include:

- The 'Unique Selling Proposition' (USP)
- The '4 P's of Marketing' – Product, Price, Place, and Promotion

- Suitable media for the promotion of the product
- Product identity and branding
- A product 'logo' or trademark
- Packaging – the presentation and protection of the product.

Many centres gave the opportunity for candidates to present their product and their marketing strategy to the teaching group, which was then recorded on video. This usually proved to be a positive experience and sometimes highlighted real possibilities for a product to be marketed commercially.

This section was marked more accurately this year, although a few centres awarded high marks for candidates who produced one or two examples of advertisements for their product without supporting explanation or justification of strategy. For marks in the highest mark band to be awarded, a thorough, in-depth coverage of all key aspects is needed, including designs for promotional materials such as posters, leaflets, advertisements, presentations, and websites. Responses covering a more limited range of aspects in depth, or a wider range in less depth, should be given marks in the middle mark band. There are two key requirements if a *'competent marketing presentation'* is to be created:

1. A clear *strategy* or *plan*.
   Details of the key marketing decisions and stages as they specifically and uniquely apply to the product that has been designed and made by the candidate.
2. *Worked-through design proposals* / samples / examples.
   Details of (for example) brand identity, packaging, an advertisement, a website….

Centres' marking of candidates' responses in this section tended to be lenient when compared with the standard set by OCR.

7 REVIEW and REFLECTION 9 marks
Review and reflect on the effectiveness of the designing and making process that led to the final product
Consider the possible wider implications and impact of the product, including possible future developments

Responses were much improved this session, with centres and candidates generally being better prepared and allowing more time. The majority of candidates structured the section effectively and attempted to address the requirements. Time management was clearly a limiting factor for many, and as a result many candidates did not complete the section and scored low marks.

There are three clear requirements for candidates' responses if they are to satisfy the assessment objective:

- REVIEW and REFLECT
- WIDER IMPACT
- FUTURE DEVELOPMENTS

For the highest mark to be awarded, all three elements need to be covered thoroughly and in depth. In many cases the Moderator was unable to confirm high marks awarded by the centre where candidates had not clearly addressed all three requirements.

A greater emphasis needs to be placed on this section by centres as it is the conclusion of the project. It looks back to evaluate the complete coursework project as a process and looks forward to consider the wider 'world context' of the product and its prospects.

Specific considerations in this section include:

- An insight into the process of designing and making
- Honest comments about the learning that has taken place.
- Use of Life-Cycle Analysis (LCA) to evaluate the wider impact of the product.
- Moral, ethical, and sustainability issues, together with economic and manufacturing issues.
- The likely success of the product in the market-place.
- Developments relating to potential industrial and commercial production (diagrams).
- Future developments including quality improvement or design variations (diagrams).

There was a tendency for the *'review of the effectiveness of the designing and making process'* to be unrealistically positive rather than an honest appraisal of the project as a whole. A few centres saw this as an evaluation of the product although the majority of candidates gave appraisals in a detailed review and reflection of their decision-making and project management.

Although responses varied considerably, most candidates made some reference to the *'wider implications'* of their product. The weakest responses generally related to *'future developments'* where few suggested in detail using diagrams what the future of the product might look like.

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

F524/01 Component 1

General Comments

Reference should be made to the published mark scheme for this unit when reading this report.

The most popular question this session was Question 6 Resistant Materials. Question 4 Graphic Products, Question 5 Manufacturing and Question 8 Textiles were of equal popularity.

There were fewer candidates attempting Question 2 Engineering and Question 7 Systems and Control. Very few candidates attempted Question 1 Built Environment and Construction and Question 3 Food although some attempted these questions without the technical knowledge or understanding to achieve the full mark range.

Parts (a), (b), (c), (d) and (f) were common across all questions.

In general, for part (a), most candidates were able to give at least two justified design requirements for the given product. There was an increase in the number of candidates who produced four, fully justified requirements

A significant number of candidates gave generic requirements or brief, unjustified statements which did not receive any credit.

Many candidates achieved full marks for part (b). Candidates demonstrated a good awareness of the influence of ergonomics on the design of products. Most responses were related to anthropometric features but a number of candidates focussed on physiological or psychological aspects.

Most candidates correctly referred to Patents, Copyright, Design rights and Registered designs as ways in which designs can be legally protected for part (c).

To achieve full marks candidates were expected to include a description or a key feature of the way of protection.

Some candidates gave the same broad description for both of their ways of protection and did not achieve full marks.

Many candidates achieved full marks for part (d) by giving clear explanations of ways in which consumers can be assured that they are purchasing a quality product. The most popular responses were; third party testing eg BSI, Consumer reports and reviews from reputable magazines/organisations and brand reputation.

Full responses were required for part (c) and (d). Brief statements did not have sufficient detail to achieve full marks.

Part (e) is a material focus area specific. With the exception of Question 1 Built Environment and Construction and Question 7 Systems and Control, part (e) (ii) included the instruction for candidates to *'Use a flowchart and/or annotated diagrams to support your answer'.*

Whilst most candidates give a suitable, specific material for part (e) (i)l, many do not achieve full marks by giving reasons that do not relate to its suitability for the given product.

The best responses to (e)(ii) were from candidates who used a combination of flowchart and annotated sketches to describe the process in detail.

A number of candidates ignored the size of the batch required and described inappropriate production methods.

There is no requirement for candidates to include the acquisition of materials from raw sources in part (e) (ii)

There were many excellent answers to part (f). Candidates were generally well prepared to raise and explain a range of issues relating to factors that influence the scale of production, and included appropriate supporting evidence or examples.

Some candidates explained the different types and levels of quantity manufacturing but did not comment on the factors that influence the scale of production; consequently not achieving the higher mark ranges.

The mark scheme for part (f) has a 'best fit ' assessment banding.

Details what is required for a Level 3 (6-8 marks) is shown below.

Clear, cogent and well-structured response with two or three issues well explained. Good use of examples and additional evidence to support discussion. Good use of technical vocabulary.

A significant number of candidates miss out on achieving full marks by not including additional evidence or examples to support their answer.

Further comments related to parts (e) are referred to in the Comments on Individual Questions.

Comments on Individual Questions

Question 1 Built Environment and Construction

There were very few attempts at this question. Few candidates achieved full marks for (e) (i). Some were able to correctly state an appropriate material eg flooring grade particle board or Vinyl tiles but did not give two appropriate properties of the material.
For (e) (ii), only a few candidates were able to provide the appropriate detail relating to floor structure that was necessary to access the higher mark range.

Question 2 Engineering

A small number of candidates attempted this question. The responses to parts (e) (i) and (e) (ii) were generally good.

Almost all candidates correctly identified a specific material and gave two appropriate properties. Some candidates used a combination of a flowchart with annotated diagrams to produce descriptions of how the scroll could be manufactured. Not all candidates described the jig required to create a scroll. All included details of quality control checks although some were very basic eg 'check length'. To achieve credit candidates must include details of how lengths are checked.

Question 3 Food

There was a very limited response to this question.

Question 4 Graphic Products

Most candidates gave a material with two appropriate properties for (e) (i). Some gave the most common material for credit cards, PVCA. Credit was given for specific plastics with similar qualities.

Whilst there were a number of excellent answers to (e) (ii), a significant number produced very brief flowcharts, lacking in detail.

The best responses made good use of annotated diagrams, in some cases as part of a flow chart, to fully describe the screen-printing process. The question was focussed on the application of the background image onto the card. Some candidates produced answers relating to the full production process, only briefly outlining the image application, and consequently achieving marks in the lower band range. Some candidates did not take into account the volume of production.

Question 5 Manufacturing

This was a popular question with a number of excellent responses. Almost all candidates identified an appropriate material with appropriate properties for (e) (i).

There were a number of excellent responses to (e) (ii). Candidates produced fully detailed flow charts (including appropriate sketches) of the steam bending or lamination of the side frame. A few candidates did not consider how or when the two ∅8 holes would be drilled.

Most candidates included appropriate quality control checks.

Question 6 Resistant Materials

This was the most popular question with a wide range of responses. There was a wide range of correct materials proposed for (e) (i), Most candidates were able to give two appropriate properties,

Some responses to (e) (ii) were outstanding; fully detailing the methods and jigs and templates used to manufacture a batch of 100 art material holders.

Some candidates did not consider the batch size and proposed injection moulding as a method of manufacture. This would not be appropriate for a batch of 100.

Question 7 Systems and Control

Almost all candidates were able to show how to transfer rotary motion through 90 degrees and provide a speed reduction for (e) (i).

Part (e) (ii) was answered well by the majority of candidates. They described in detail how pulse width modulation could be used to control the speed of a DC electric motor. Some candidates did not access the full mark range, as they did not include a circuit diagram.

Question 8 Textiles

There were a number of very good responses to this question.

Most candidates identified Goretex or Polyester as a specific fibre for the outdoor jacket and gave two appropriate performance characteristics for part (e) (i).

There were a number of excellent, fully detailed answers to part (e) (ii).

Most candidates used a combination of flowchart and annotated diagrams to describe how to insert a zip fastener and secure the lining.

F524/02 Component 2

General Comments

Reference should be made to the published generic mark scheme for this unit when reading this report.

Where candidates to circled the question number attempted on the first answer sheet and had written their name and candidate number on each answer sheet it aided the marking process as did placing the answer sheets inside the folded cover sheet without further fastenings.

Work of Candidates

Many of the comments in this report reiterate those from reports from past series and it is important that candidates are fully prepared for this examination.

This is a demanding unit, assessing the ability of the candidate to design creatively whilst considering the practicalities of the needs of both user and manufacturer. The more able candidates cope impressively, showing awareness of the wide range of factors that will influence the success of a product and drawing on knowledge and skills from all units of the course.

Candidates are free to choose any of the questions even though each question is associated with a specific focus area. It was clear that many candidates took advantage of this freedom and answered a question that was outside the area for which they had been prepared. In many cases this resulted in poor marks in some sections because of the lack of appropriate technical knowledge that would be needed to manufacture the product.

In general candidates completed this paper fully with relatively few showing any indication of poor time management. A very small number of candidates had used extra sheets in their responses. This is strongly discouraged because part of the challenge of the paper is to communicate effectively and concisely. Candidates who use extra sheets tend to lose their focus on the requirements of the paper and ultimately score less well than those who work within the allotted space.

Comments on each of the marking criteria:

Specification Points (S):

Candidates are asked to write three specification points. To be awarded full marks each point must be directly relevant to the brief and justified in relation to the function of the product, the potential user or the manufacturer of the product.

Many candidates did not score highly in this section through simply repeating information given in the question or making generic points relating to issues such as the need to be cost effective, aesthetically appealing or ergonomically suitable. Factors such as these are relevant to **all** products so to be given credit in this section they must be carefully justified indicating more specifically how each would influence the design of the product.

Candidates are strongly advised to consider the key functional aspects of the product when writing their specification points. All specification points should be over and above the basic outline for the product set out in the question.

Range of Ideas (R):

To achieve high marks in this section there are two complementary demands: firstly to produce a number of **different** concept solutions to the design brief set in the question, secondly to develop each concept to show details of possible alternatives and to consider how modifications could better suit the needs of user and manufacturer. Particular credit is given for innovative ideas, which show an original approach to the design brief.

The majority of candidates performed quite well in the first of these demands but many failed to reach the higher marks because they showed little if any evidence of development beyond the initial concept. In a few cases ideas presented were unrealistic with little prospect of fulfilling the design brief. High marks can only be awarded for ideas, which are completely suitable and satisfy the set brief .

Less able candidates simply presented a broad outline of initial ideas, which frequently were based on established commercially available products.

Technical Detail (D):

Assessment of this criterion was based on three strands:

- consideration of methods of construction, assembly or manufacture;
- understanding of suitable materials, components, or ingredients;
- details of dimensions or quantities.

At this level of examination candidates are expected to have detailed knowledge of materials and components, and how these are used to construct, assemble and manufacture commercial products from their focus area. In this unit they are expected to be able to relate this knowledge to their own design proposals. The more successful candidates showed good subject knowledge by offering realistic options for construction and justified choices of materials by reference to their properties and performance. In some cases suggestions for construction and materials were inappropriate whilst a significant number of candidates made no reference to specific materials or construction details at all. No credit can be given for generic terms such as 'wood', 'metal', 'plastic' or 'card'.

In most cases dimensional detail was limited with relatively few overall dimensions given. For full credit in this area at least some more detailed dimensions must be given, for example thicknesses of material or sizes of standard components, which would be used to produce the product.

Evaluation of ideas with reference to specification and volume production (E):

This was done well by some candidates who considered how the product would be used and manufactured and drew attention to both positive and negative aspects of their designs.

In many cases comments were summative rather than evaluative becoming simple statements that did not show any evidence of balance in value judgement.

A few candidates used summary tables to evaluate their ideas, often with simple ticks or crosses, or scores out of ten to show success or failure. This should be discouraged because it does not allow the candidate to show the depth of thought necessary for high marks at this level.

Final Developed Outcome (F):

In this section candidates are asked to 'sketch a final developed outcome' and to 'justify key design features'. Most candidates presented a final idea, which showed specific features, which would be appropriate to a final solution but more explanation or justification of the features was needed in most cases.

Communication (C):

The mark awarded for communication is based on a combination of factors:

- the overall clarity of presentation evident in the layout of the three design sheets of the paper;
- the range and quality of graphical skills evident;
- the use of clear annotation which communicates the quality of the candidate's design thinking.

When preparing for this unit it is important that candidates practice the use of a range of graphical techniques (for example 2D, 3D sketching, cross sections, exploded views) and the appropriate use of these to show construction and assembly detail.

Techniques of annotation (for example using arrows to connect comments to specific points) avoiding long passages of text would also help candidates communicate speedily and effectively.

The more able candidates show impressive skill, managing to communicate broad concepts whilst also including useful detailed sketches and informative notes on clear, attractive sheets.

Comments on Individual questions:

Question One: Washing facilities for a community farm (Built Environment and construction)

As in previous series this question seemed to attract non-specialists who could not support their ideas with sound technical knowledge. Many candidates proposed very large structures rather than the modest accommodation specified in the question. Few showed any knowledge of construction technology and very few considered the water supply and drainage requirements, which would be fundamental to a successful washing facility.

Question Two: Lightweight work platform (Engineering)

Most candidates answering this question focussed on the functional requirements of the product and so were well placed to access all areas of the mark scheme. The majority of solutions were based on existing commercial products but more successful responses did show evidence of innovation and design thinking; for example including facilities to hold tools and materials so that they are convenient to reach whilst the platform is in use.

Question Three: Snack product for teenagers (Food)

Typically candidates answering this question produced a reasonable range of ideas that suited the requirements for a breakfast snack from a nutritional point of view but did not address the specific needs of retail through a vending machine. Few gave any consideration of possible mechanical movement or handling of the product and surprisingly few considered the need to package the product in a way to maintain hygiene and structure.

Question Four: Facemask and hat for children at parties (Graphic Products)

This was a popular question that produced a very mixed response. Many candidates seemed to ignore the requirement to include 3D features, merely sketching a range of masks and hats, which showed superficial changes of 'characters'. The more successful responses moved beyond this to also consider the technical development needed to create the 3D structures whilst maintaining commercial viability. The knowledge of materials and processes varied significantly between candidates with some showing detailed understanding of a range of commercial processes, yet others giving little or no technical detail at all.

Question Five: Childproof container for used batteries (Manufacturing)

This question produced an interesting range of responses; some focussed on the need for security, for example using childproof closures whereas others concentrated on disguising the product so that a child would not be attracted to it. Either concept was acceptable giving candidates a wide range of possible solutions. In some cases candidates proposed elaborate ideas that would be far too difficult and expensive to manufacture commercially – a particularly pertinent requirement for this focus area.

Question Six: Child's painting unit (Resistant Materials)

This was a popular question with many good responses that combined both functional and aesthetic requirements to produce viable solutions. The most successful answers included storage areas for materials and also had clear reference to the ergonomic implications of the child sitting or standing to paint or draw. Most candidates produced a suitable range of concept ideas but the level of development and technical knowledge around the ideas varied widely.

Question Seven: Preventing saucepans boiling over (Systems and Control)

Most candidates answering this question produced solutions based on sensing temperature or rising water levels with electronic control of heat input. Whilst these are valid proposals, relatively few candidates appeared to consider the nature of the heat input (eg different types of fuel used for cooking) and how this would be controlled. Very few then managed to 'package' the concept to produce a recognisable 'product' so that it became difficult to understand whether or not the solution was a standalone product or part of the saucepan or the cooking appliance.

Question Eight: Textile educational toy (Textiles)

This was a very open ended brief that invited a wide range of proposals. In most cases concepts were very familiar ideas with little innovation or development beyond products, which are currently available. More successful candidates showed good technical knowledge with details of construction and choices of materials clearly explained.

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