

Examiners' Report Summer 2008

GCE

GCE Design and Technology - Product Design (8109/9109)

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Principal Moderator's Report summer 2008
GCE AS Design & Technology: Product Design
Graphics with Materials Technology unit 6145/01

General

As this was the second year of the revised assessment criteria including the assessment of the criterion H, Quality of Written Communication, (QWC). It is pleasing to report that, in general, the standard was maintained with a very similar number of the candidates passing at the highest level and a small increase in the number of the candidates passing at the lower level.

The moderators in general felt that the re-wording of the assessment criteria was helpful to the candidate's work that they saw and it is hoped that this will continue on to the full A2. It is therefore imperative that the centres use the correct CABs when assessing the work of their candidates.

Many centres have adopted a structure to the folders that mimics the assessment criteria and this certainly aids the moderation process.

The moderators reported that, in general, the centres seemed to understand the requirements of the specification and that although adjustments were made; centre marks appear to be more accurate year on year. As a general feeling, they reported that the marking at the top of the assessment criteria was a little generous, however; the statistics seem to bear out the fact that the standard has remained consistent.

The main areas of concern were criteria C, D, E and to a limited extent F.

Administration

The moderators did report problems that occur every year and so it is important to reflect on these issues and endeavour to ensure that moderators continue to reduce the frequency of these problems or indeed eradicate them if possible. The issues were:

- The number of projects of 60 plus pages was much reduced but still in evidence this is not appropriate, as advised in the specification and at INSET events 26-30 pages are sufficient.
- Projects/CAB must include photography of both the 2D and the 3D element.
- They must clearly show the Resistant Material element.
- Ensure that the quality of the photography is high therefore enabling the moderators to assess the standard of the work.
- Centres must submit the work of the top and bottom candidates as part of the sample even if they are not asterisked on the OPTEMS.
- Addition errors in the CABs are still in evidence.
- The centres MUST use the correct CAB booklets as they are now individualised for the level being undertaken. These can be obtained from publications.
- Incorrect marks transcribed from the CABs to the OPTEMS.
- Intermediate marks entered in criterion G

Criterion A

This was generally a well handled section with many candidates performed at the standard that is expected. In many cases, candidates produced a well thought out problem and brief which opened up a range of research possibilities. Moderators saw some good examples of the candidates producing some good specifications growing from the research. Indeed at the top end of the candidature moderators saw the specification modified on a number of occasions in the light of further research.

In most cases the candidates are more focussed and they are using the research to influence their designs, but moderators did see candidates that did not use measurable elements in their specifications.

The candidates that scored less failed to provide evidence in two elements of the assessment criteria; the specifications lacked depth and the analysis was poor.

In a number of cases the specifications did not use the research and they were rather simplistic; further to that, at the top of the assessment criteria moderators should see quantifiable elements within the specifications that are measurable at the completion of the project. A significant number of candidates failed to submit a sufficient number of quantifiable/measurable elements in their specifications.

The major weakness in this section was the analysis of the research, majority of the candidates did not analyse and annotate the research well, they failed to sift the really relevant information and then state how and why this was important to the given problem. Moderators can see that the candidates collecting information and recording what they have done and then through careful annotation defining the useful effect that the information might have on the possible solutions.

Criterion B

In this section the moderators again felt that this was well evidenced by many of the candidates, moderators did see a good range of ideas and some different strategies employed. In the best cases the candidates produced some excellent inspired ideas sections; moderators saw 2D and 3D drawing used to good effect as well as the use of markers overlays and inspiration materials. These are all good examples of useful design strategies.

A number of candidates failed to score well in this section because they:

- Failed to produce a range of ideas, often due to the lack of a range of strategies.
- Did not show a maturity of approach e.g. Draw 6 ideas and then choose one.
- Produced ideas that were not significantly different in concept.
- Evaluated the ideas using very simple methods e.g. 6/10 with no explanation.
- Failed to show real technical understanding of the processes and materials

Moderators did see some candidates work that had been given good advice regarding the way in which ideas should be evaluated, this was especially good where the candidate had written a careful specification, with measurable elements, and then used that to assess the success of the ideas produced. In summary the candidates should use a range of strategies to generate a range of ideas that are different in concept and then evaluate those ideas using measurable criteria from the specification.

Criterion C

This section, as has been the case for a number of years, was the weakest section, but it is pleasing to report that the moderators did report some improvements. It appears that this may well be due to the revised of the assessment criteria.

Many candidates showed some good examples of modification especially in the use of models and modelling techniques. The quality of the modelling was better than in previous years; this was modelling using traditional materials and the use of software packages such as Pro-desk top. The use of ICT should be focussed on the product and therefore relevant to it.

In the best cases, the candidates used CAD packages to good effect along with intermediate models to test aspects of their final designs they undertook an analysis of looking at manufacturing possibilities as well as relevant resources and equipment. This analysis of the development manifests itself in the annotation by the candidates, and moderators were instructed to look for evidence of this critical progressive refining of the final proposals if a top box award were to be given. It is pleasing to see these improvements in what has been a most difficult section for the candidates to get to grips with.

Moderators did still see candidates that failed to submit any development they simply re-produced the final design, it is clear in these cases that the marks will be at best somewhat reduced. Candidates should also concentrate on the detailed development of their final proposals the exploration of possible materials and processes they might undertake. This section must culminate in a final proposal.

Criterion D

The candidates again showed some improvement in this section in terms of the planning aids that they employed for instance flow charts, time plans critical path analysis, but in a majority of cases they failed to produce a working drawings. It is imperative that this is undertaken and it is impossible to enable third party to manufacture without a fully dimensioned working drawing. Moderators did see a small increase in the number of candidates that submitted good quality working drawings.

Minority of candidates submitted little or no planning but some marks were awarded if the candidate had manufactured the product therefore implying some planning had taken place.

In the best cases the candidates who did produce a working drawing, often produced work in pro-desk top; however even in these cases many candidates submitted drawings with unedited dimensions. Moderators would like to see the flow charts and time plans linked to the working drawings along with some evidence of quality control/assurance and examples of the assessment of risk.

A diary of the manufacturing process will not be assessed in this section it is useful to provide evidence for the product manufacture, but is clearly retrospective and therefore by definition, not planning.

Criterion E

This section of the assessment criteria was the most over-marked section in general because moderators saw too many simple undemanding projects. As in previous years I urge centres to ensure that the products that they undertake are a step up from GCSE. If moderators do not see this progression moderators cannot award marks in the higher ranges of the assessment criteria. A number of moderators reported that they saw very few high quality products moderators must take care to ensure that the candidates are given the opportunity to show a range of demanding product manufacturing skills. The diary of manufacture is good as evidence for this aspect of this particular assessment criterion.

Moderators did see some high quality products, some very good concept modelling and some excellent architectural examples. Moderators did see an increasing number of processes being used as well as an increase in the use of CAD.

Architectural modelling can be very successful but in many cases they were simple block models and layouts, they must have scale and detail. The overuse of the laser cutter is a concerning trend, candidates will attract a penalty if that is all that they have done. This single skill and a simply assembly will not allow candidates to score top box marks; this is not a range of high level demanding making skills. Indeed in some cases candidate had not actually touched any element of the product for example the 2D element had also been produced using CAM. In summary, the candidates have to show progression from GCSE and to demonstrate a range of higher level making skills.

Criterion F

This section was again reasonably well done, but many candidates failed to undertake any testing at all. It is important to ensure that the candidates are encouraged to put the product into service were possible.

Moderators saw some good examples of testing, especially, the use of specialists to assess the success of a product or indeed a range of products.

A few moderators reported that this section was better and some centres gained useful marks by undertaking some form of realistic testing. It is also a mark of a good candidate when the product is rigorously tested against the specification.

Criterion G

The vast majority of the products were wholly appropriate for this specification. A number of centres pushed the limit of the specification with regard to the amount of resistant materials that were used, and some did attract a penalty. However this situation is much improved. Moderators still saw the occasional use of intermediate marks in this section of the assessment criteria; it is 0, 5, or 10.

Criterion H

The moderators reported that this section was either well marked or that centres had simply awarded high marks to all candidates. A number of these candidates were moderated down. Moderators must see the correct use of technical vocabulary, in the correct context with the correct spelling if they are to gain the highest marks.

The other issue with regard to this new criterion is that centres must use the correct CABs to assess the work, as this has the QWC marks on it. A number of centres used the incorrect CABs and so the award of QWC was made at the moderation event.

Principal Examiner's Report summer 2008
GCE AS Design & Technology: Knowledge and Understanding of Product Design
Graphics with Materials Technology unit 6146/01

General comments

The Principal Examiner and the examining team were impressed with the fact that the vast majority of candidates had at least attempted all the questions on the paper. Very few responses were simply left blank which suggests that teachers are encouraging their students to at least give 'educated guesses' and not simply give up when they encounter a difficult question.

Poor hand-writing and use of grammar continues to be a problem for the examining team when attempting to award marks.

Teachers should continue to encourage students to answer in concise sentences or even bullet points and to avoid long and repetitive responses, especially to extended-writing type questions such as 'evaluate'.

'Explain' style questions continue to cause problems for some students. Teachers should continue to thoroughly prepare their students for exams, especially the use of the following command words:

Command word	Marks awarded	Description
Give, State, Name	(1 mark)	These types of questions will usually appear at the beginning of the paper or question part and are designed to ease you into the question with a simple statement or short phrase.
Describe, Outline	(2+ marks)	These types of questions are quite straightforward. They ask you to simply describe something in detail. Some questions may also ask you to use notes and sketches; you can gain marks with the use of a clearly labelled sketch.
Explain, Justify	(2+ marks)	These types of questions will be commonplace in this exam. They are asking you to respond in detail to the question - no short phrases will be acceptable here. Instead, you will have to make a valid point and justify it.
Evaluate	(4+ marks)	These types of questions will appear towards the end of the paper and are designed to stretch and challenge the more able student. They will always be awarded the most marks because they require you to make a well-balanced argument, usually involving both advantages and disadvantages.

Question 1(a)

Specification reference: 2.1 Materials and components - woods

A good start to this AS level paper for the majority of candidates. Many were able to apply their knowledge and understanding of hardwoods and softwoods to the given product. However, a common incorrect response stated that softwoods were 'softer, so would not hurt the child' which indicates a lack of understanding on the part of the candidate.

Question 1(b)

Specification reference: 2.3 Hand and commercial processes - finishing processes

The majority of candidates were able to gain full marks on this question. This part of the specification has either been taught well or candidates already had prior knowledge of wood finishes.

Question 1(c)

Specification reference: 2.4 Scale of production - batch production

This question was based upon the legacy specification Unit 1: Product analysis paper from which this updated specification derived.

(i) Preparation was generally well answered but specific examples such as bought in materials/components and setting up of specific machinery in order to produce the product were often missing.

(ii) Production was generally less well answered as candidates failed to name or describe specific manufacturing stages. A significant amount of students simply gave a generic description of the production stage, and as a result, could not access the full marks.

(iii) Assembly stages were generally poorly answered with many candidates unable to name a specific process at all. This was surprising, as a response such as 'gluing the parts together' would have gained a mark at this stage of the paper

Question 2(a)

Specification reference: 2.3 Hand and commercial processes - drawing

The vast majority of candidates at least attempted a third angle orthographic representation of the product. Some simply sketched another pictorial drawing. Many candidates were able to access the higher marks due to an expanded mark scheme, whereas incorrect placement of elevations and insufficient detail on each elevation prevented many from gaining half marks.

Question 2(b)

Specification reference: 2.1 Materials and components - components

An extremely limited number of components are names in the specification. Amongst them are pencils and colouring pencils.

(i) Many candidates were unable to name the two materials used in coloured pencils. Many gained a mark for 'coloured pigment' but incorrectly stated 'graphite' as the other.

(ii) Many students misunderstood this question and responded with phrases such as 'a HB pencil is softer' or 'a HB pencil makes a darker line'. However, the question referred to the composition of the pencils and not the characteristics.

Question 3(a)

Specification reference: 2.4 Product manufacture - scale of production

A very well answered question with many candidates correctly identifying 'continuous' and not 'mass' production as the scale of production.

Question 3(b)

Specification reference: 2.3 Hand and commercial processes - thermoforming

The majority of candidates were able to achieve at least two marks from their notes and sketches. However, it was apparent that some candidates had confused blow moulding with either injection moulding or even casting.

Question 3(c)

Specification reference: 2.1 Materials and components - polymers

A generally well answered question with most candidates able to justify at least one property of PET. Some candidates were unable to fully justify their responses, instead offering simple statements, which meant that they could not access full marks. A common incorrect response was 'can be recycled' which is not a property.

Question 3(d)

Specification reference: 2.5 Design in practice - the basic principles and application of anthropometrics and ergonomics - standard sizes and dimensions

Again, the majority of candidates were able to state two reasons for the bottle size i.e. 'ergonomics' and 'standard volumes' but were unable to fully justify their reasons. An explain question requires a full answer i.e. a statement (1 mark) plus justification(s) (1+ marks).

Question 4(a)

Specification reference: 2.3 Hand and commercial processes - printing processes

Many candidates were unable to score a mark on this question. Many named 'offset lithography' as an appropriate printing process which suggests that they were guessing as offset litho is often taught as the most widely used of the printing processes.

Question 4(b)

Specification reference: 2.3 Hand and commercial processes - thermoforming

Many candidates demonstrated knowledge and understanding of the injection moulding process but were unable to give two justified reasons for its use in the product. This 'explain' question required a statement (1 mark) plus a justification (1 mark).

Question 4(c)

Specification reference: 2.5 Design in practice - the effects of D&T changes on society - mass production and the consumer society

A generally well answered question with the vast majority of candidates able to write an informed response containing both advantages and disadvantages. Higher scoring candidates used bullet points or wrote in concise statements rather than 'rambling' sentences which often led to repetition of statements.

Question 5(a)

Specification reference: 2.3 Hand and commercial processes - finishing processes

The majority of candidates were aware that polymers are self finishing or words to that effect. The most common incorrect response was that the container would be simply 'thrown away, so there was no need for a finish'.

Question 5(b)

Specification reference: 2.1 Materials and components - metals and alloys

Many candidates were able to successfully state a reason for the use of aluminium foil but justifications were sometimes unrelated. Candidates scoring two marks commonly responded 'Aluminium is a good barrier to bacteria (1 mark) therefore it keeps the yoghurt fresh (1 mark)'.

Question 5(c)

Specification reference: 2.3 Hand and commercial processes - CNC machining

No justification of statements was required for this question, so many candidates were able to give three reasons why the moulds were CNC machined. It must be noted here that 'cheaper' is not a suitable response i.e. cheaper than what? Therefore, 'cheaper than highly skilled manual labour' is a perfectly acceptable response to this question.

Question 5(d)

Specification reference: 2.5 Design in practice - the effects of D&T changes on society - issues related to local/ global production

The vast majority of candidates were able to correctly state that it is 'cheaper to manufacture in China than in the UK'. However, many were then unable to go onto describe any other advantages of 'offshore manufacturing' such as, for example, specific skills and expertise that China can offer or the use of digital communications to ensure effective communication between the UK and China.

Question 6(a)

Specification reference: 2.4 Product manufacture - quality standards - testing against external quality standards

Candidates with a good knowledge and understanding of quality standards and the BSI were able to gain full marks on this question stating 'safety' and 'fitness for purpose'. Many candidates, however, answered in terms of testing 'products' rather than 'materials' as the question had asked.

Question 6(b)

Specification reference: 2.4 Product manufacture - quality standards - testing against external quality standards

Although many candidates were able to successfully sketch and name the 'British kite mark', the examining team found it surprising that a significant amount of candidates were unable to gain full marks. Candidates either knew the name of the symbol, but were unable to accurately sketch it or vice versa. Common incorrect responses were the 'CE' mark and the 'Lion' mark for toy safety.

Question 6(c)

Specification reference: 2.4 Product manufacture - quality standards - standard performance tests

The majority of candidates were unable to gain full marks on this question. Many candidates simply did not know the answers but many got the properties of 'hardness' and toughness' mixed up which was frustrating for many examiners. A minority of candidates were able to name the specific BS performance tests with many simply describing it which suggests that this area of the specification is being taught.

Question 6(d)

Specification reference: 2.4 Product manufacture - quality standards - standard performance tests

Although many candidates attempted this question, very few were able to gain full marks. It was obvious to see that many candidates, although they did not know the specific tensile test, were able to give an educated guess and as a result scored one or two marks. Please note that as well as the whole paper being ramped in difficulty, each question is also ramped, therefore this question was aimed at higher grade candidates.

Question 7(a)

Specification reference: 2.1 Materials and components - composites and laminates

Many candidates were able to gain full marks on this question due to an expanded mark scheme and a good knowledge and understanding of creating shell structures with GRP. However, a significant amount of candidates confused the process with a thermoforming process and therefore, answered in terms of vacuum forming a shell structure. Some candidates simply described the composition of GRP and not the actual process.

Question 7(b)

Specification reference: 2.1 Materials and components - composites and laminates

A generally well answered question with many candidates able to gain full marks with justifications for 'strength' and 'lightweight'. The majority of candidates were at least able to gain two marks for two statements.

Question 8(a)

Specification reference: 2.5 Design in practice - influences on the development of products - design and culture

A slight departure from previous questions of this type. The focus was this time placed upon the Bauhaus movement and options given under this topic. The options were designed to give credit for a candidate's knowledge and understanding of a broad range of design issues. Consequently, the most commonly attempted philosophies were 'Form follows function' and 'Less is more' as these issues relate to all design movements. Many candidates were able to gain full marks on this question with even the 'educated guesses' being able to score at least one or two marks.

Question 8(b)

Specification reference: 2.5 Design in practice - influences on the development of products - eco design

A generally well answered question due to an expanded mark scheme. Again, candidates who wrote concise statements were able to gain full marks whereas those who wrote long rambling sentences tended to repeat themselves. It is good to see that students are aware of the issues relating to eco-design and sustainability which is/will be a major issue in the design of all new products.

Principal Examiner's Report summer 2008
GCE A2 Design & Technology: Further Study of Product Design
Graphics Materials Technology unit 6147/01

General

It was noted by examiners that there were very few questions left blank. The majority of candidates had attempted to answer all questions.

Examiners frequently reported that it appeared that candidates had not read the question fully and because of this lost marks, often heavily. This frequently led to candidates not answering the question asked. Candidates must take some time in digesting the question before leaping in to answer it.

Many candidates appeared not to understand basic terminology that the qualification uses. 'Describe' requires a statement and an enlargement upon the statement to gain the second mark. 'Justify' requires more than one word or short phrase to get the marks allocated. I draw attention to the comments made at the end of the Principal Examiner's Report for 6146, which clearly outlines what is expected in terms of responses from command words.

Centres should explain to candidates that the answer supplied by the candidate should fit into the space allocated on the question paper. Many rambled on with the answer, often on to additional sheets, penalising themselves with the amount of time used and often with few or no marks being awarded. If extra sheets are being used it would help all concerned if candidates noted that the answer continues elsewhere. Candidates should aim to answer questions in concise sentences and avoid repetitive responses especially in 'evaluate' or 'outline' extended writing questions. Bullet points could be used to reduce this problem.

The quality of handwriting appears to be getting worse as does the use of grammar and spelling. Examiners must be able to read the answers and it is obviously an advantage to the candidate if examiners can decipher what has been written.

Question 1a

Generally a well answered question with many responses giving 'easily moulded', 'hot water' and 'easily altered' in their answers. It was reported that a sizeable minority had not been taught this topic of smart materials.

Question 1b

Many candidates gave good responses to this question referring to the ability to absorb light energy and glow in the dark without any external power supply. A sizeable number of candidates confused 'phosphorescence' with 'reflective' and accordingly gave incorrect answers.

Question 1c

This was a well answered question with many candidates gaining full marks and showing a good understanding of the advantages of Biopol. The most regular incorrect answer focused on recycling Biopol.

Question 1d

There were a wide range of responses to this question but with only a few candidates gaining full marks, however, they usually managed to gain half marks. Popular correct responses included layering card and paper to make stronger, honeycombing and treatments for fire proofing and waterproofing. Many gave responses that included encapsulation, turning to pulp and reforming as a board or mixing with concrete. The genetic modification of trees was also a common response.

Question 2a

This was a very popular question where the majority of candidates frequently achieved full marks. Candidates tended to lose marks for not showing how the bulbs were to be secured in transit adequately.

Question 2b

Again this was a very popular question with many good solutions. Candidates lost marks for either failing to either show suitable text for saving the planet/reducing the carbon footprint or saving money/longer lasting light bulbs.

Question 2c

The vast majority of candidates scored well on this question showing a sound depth of knowledge on the subject of consumer rights.

Question 2d

Most candidates showed they had a clear understanding of their statutory rights when purchasing a product. A few candidates missed the point that they could complain and ask for money back or change of product.

Question 3a

This was a very popular question with many candidates scoring full marks with responses referring to 'scanning', 'saving time', 'stock control' and 'reordering'. A common error was one of misinterpretation, where candidates responded with regard to moving displays relating to point of sale displays.

Question 3b

This question was attempted by most candidates with varying degrees of success. Most understood the principles of RFID's and the differences between them and bar codes but few gained full marks because they failed to compare one with the other as asked in the question.

Question 3c

A popular question attempted by many candidates. Many were able to identify that video conferencing can save money because travelling expenses were not incurred or that the school did not have to buy expensive equipment. Unfortunately a significant number of the candidates only focused on video conferencing in general and not on remote manufacturing which meant that few marks were scored.

Question 4a

Many candidates failed to attempt this question. Of those who did very few managed to score full marks. The majority showed little understanding of the closed loop feedback system. Those who did often attempted to draw complex systems. Many failed to put in the feedback loop and some gave a continuous loop as an answer.

Question 4b

This was a very poorly answered question with very few candidates showing any understanding of the closed loop system.

Question 4c

This question was very poorly answered by candidates. Very few appeared to understand that degrees of freedom refer to robotic arms and how they can move from a fixed position. Many discussed how the term indicated that robots could move around within defined tolerances or general tolerance allowances.

Question 4d

A full range of responses were offered with only a minority of candidates achieving full marks. A common response was that a team would do different jobs, with no reference to working together.

Question 5a

This question clearly asked for 'scales of economy'. Unfortunately many candidates missed this and discussed the advantages of mass production. Whilst some of the points raised could be interpreted as scales of economy most missed the point completely. The most common response was about bulk buying reducing costs. Very few candidates appeared to show a clear understanding of economies of scale.

Question 5b (i)

Candidates showed a sound understanding of what information is required. Unfortunately many failed to read the question and gave a simple list. Candidates were asked to outline, not state. Outline requires more than a single word, ie 'when production must start' and not 'start'.

Question 5b (ii)

Very few candidates were able to supply a satisfactory answer to this question showing little understanding of co-ordinate measuring machines and their operation in quality control. Only a few candidates were able to identify sensors / lasers would be used to measure the part. Many were able to identify that they are used to ensure accuracy of the part and within tolerance.

Question 6a

This was a very well answered question by the majority of candidates. They identified relevant points such as 'efficient use of materials', 'efficient use of energy' and recycling then explained the relevance of the point.

Question 6b

The majority of candidates showed considerable knowledge and understanding of the problems associated with recycling. This allowed them to achieve good scores with responses including 'reduction in quality' and 'paper can only be recycled a few times'.

Question 6c

Many candidates interpreted this question as one on fair trade or global economics and consequently failed to achieve marks. Candidates also failed to connect the points they made with sensible justifications such as 'protecting the earth's finite resources' without explaining why. Few scored full marks on this question.

Question 7

This question was a very well answered question with many candidates scoring over half marks but few scoring the full 8 marks. The candidates offered a wide range of both advantages and disadvantages but tended to repeat themselves, especially those who used additional sheets for this answer. Common responses included, '24/7 production', 'greater efficiency', 'unemployment' and 'high start up costs'. Many candidates produced long answers, often repeating themselves.

Principal Moderator's Report summer 2008
GCE A2 Design & Technology: Commercial Product Development
Graphics with Materials Technology unit 6148/01

General

The moderators reported that the standard appeared similar to last year. The weakest sections were, as appears to be the norm with this specification, the development section, the planning and the product manufacture.

Moderators still saw some work that was significantly below the standard required for this examination and a number of inappropriate products normally resistant materials. Many candidates did not produce products with the appropriate level of demand and so a large number of adjustments were made in section E, thus making a majority of centres generous in their marking.

The moderators reported a general concern that a great deal of scanned imagery was in evidence and that moderators saw an increasing use of CAM as the only method of manufacture.

It is as ever worth reminding centres that they must encourage their candidates to operate at the full A level if they are to gain the highest awards.

Candidates at A2 should:

- Undertake projects that have a level of complexity suitable for A2.
- Work as a real designer would when assigned to a commercial brief this should include the use of a client or target market.
- Be specific about the investigations they undertake.
- Take into account industrial practice that is relevant to the brief.
- Manufacture high quality outcomes, at the correct level of complexity, having planned them in detail beforehand.
- Return to the client or target market to test hypotheses, at all stages of the project.
- Show technical knowledge and understanding throughout the project.
- Develop their proposals in the way a commercial designer might.

The moderators were instructed to look for the above criteria and so if a number of elements are missing the candidates cannot achieve marks at the top levels of the assessment criteria.

Administration

The moderators did report problems that occur every year and so it is important to reflect on these issues and endeavor to ensure that moderators continue to reduce the frequency of these problems or indeed eradicate them if possible.

The issues were:

- Projects/CAB must include photography of both the 2D and the 3D element.
- They must clearly show the Resistant Material element.
- Ensure that the quality of the photography is high, therefore enabling the moderators to assess the standard of the work. In some cases centres failed to submit any photographs.
- Submit projects in an easily handled, well bound A3 format.
- Centres must submit the work of the top and bottom candidates as part of the sample even if they are not asterisked on the OPTEMS.
- The centres MUST use the correct CAB booklets as they are now individualised for the level being undertaken.
- Incorrect marks transcribed from the CABs to the OPTEMS.
- Intermediate marks entered in criterion G
- The teacher annotation should reflect the students work.

Criterion A

The moderators reported that the response to this section was generally good, but in many cases the candidates did not identify a real client therefore the research lacked the focus that moderators have been striving for. Candidates that used a real client benefited from the analysis of the task being given real focus and some reality. In the best cases, the research was imaginative and original one moderator commented on the 'blue sky' nature of a candidate's research.

In many cases, candidates who did not have a client or target market research lacked some relevancy; the value of the use of a client at A2 cannot be underestimated.

A significant number of the candidates did not link the research with the specification so that the result was a rather general specification lacking client input and having very few quantifiable elements to it. This does not allow the candidates to test any ideas or proposals with any real accuracy.

Many candidates failed to analyse the research in a clear and logical manner moderators must be able to see the candidates annotating within their research with discerning and the elements that are relevant with them stating why that research and understanding will influence the candidates thinking in subsequent sections. In the best cases the client would also be consulted at this point.

It is important that the candidates are encouraged to look at commercial practices, use product analysis to assist the development of a sound specification and use the client to focus the research.

Criterion B

The moderators reported that this section was not handled as well as last year. Moderators are expecting to see a wide range of ideas. Candidates' who uses a range of strategies also uses the feedback obtained from the client to further generate possible solutions. This was not always the case, the real key in this section is the annotation, where moderators can see mature commentary, using technical terms, and the candidates are surefooted in the approach they take to designing. They use the work of others to good effect and are able to think laterally about possible solutions. In the best cases moderators saw some super examples of the ideas growing out of the research, showing real detail and a grasp of the relevant technical knowledge and understanding required at this level. Moderators saw some very good examples of detailed sketching and a range of significantly different ideas presented in this section. With the best candidates, moderators found ongoing evaluative commentary along with conversations/communications with the client.

It is some what disappointing to report that a significant number of moderators reported that the quality of the candidates' graphic communication skills had deteriorated on previous years.

It is good commercial practice to initially brainstorm ideas and sketch these quickly. The refining of these ideas should come later.

The major issues in this section were the lack of evidence of the research, and evidence that the candidate's technical knowledge and understanding was influencing the ideas. This is a clear key indicator of commercial methodology and if it is not evidenced, the candidates cannot access the top marks in this assessment criteria. The range of design strategies again this year was not in evidence in many cases. Moderators are also looking for candidates being innovative in the range of design strategies used e.g. different media being used, group initial brainstorms undertaken or using the inspiration of others thus mimicking commercial practice.

Criterion C

It has been the case for the past few years, that this section is again one of the most difficult for the candidates. However the moderation team did report some improvements in the work that they saw. This is very pleasing to report as it appears that candidates are starting to understand that their initial ideas need to be refined such that they become feasible solutions to the problem.

In a number of cases moderators saw some very good use of a range of software packages such as Pro-Desk top, Sketch Up, Illustrator and Photoshop. This is to be commended as these are all useful modelling packages and this enables candidates to mimic commercial practice.

In the best cases the candidates did refine their work using traditional and ICT based modelling techniques and backed that up with some excellent annotation. They then followed this up with a dialogue with the client which again often resulted in further refinement of the product. Moderators reported that this was better but was still not the norm.

In many cases the candidates did not refine their work, often simply re-produce their final design. The candidates must be encouraged to use the client, modify and refine the designs, model and test solutions and to use their technical knowledge and understanding to ensure that the final proposal is feasible.

Moderators often felt that the 2D element was an afterthought; the two elements should be refined at the same time as they are supposed to be linked. A number of candidates submitted elements of planning in this section detailed drawings etc. would be marked in criterion D.

Criterion D

In the planning section for the A2 submission moderators are expecting to see the students planning the production with respect to time, giving some consideration of the scale of production and looking at possible commercial methods. Moderators would also expect to see use of quality control points and some mention of quality assurance procedures; including how this would be done in mass or batch production situations. In the best cases, moderators also saw a number of students detailing the health and safety considerations in the planning stage for example the use of risk assessment techniques and further risk management suggestions being made. Moderators did see encouraging work in this section. Many candidates used flowcharts and Gantt charts to good effect and moderators did occasionally see the use of critical path analysis.

In a number of cases the candidates submitted diaries of the product manufacture; these are very useful in the assessment of criterion E but are clearly retrospective therefore gained no marks in this section.

Candidates that manufactured a product but produce no evidence of planning gained some credit as the manufacture implies that some planning has been undertaken.

The better planning sections are characterised by candidates that produce a high quality working drawing that would enable a third party to manufacture the artefact. This situation has improved to a limited extent as the students become more competent in the use of CAD packages to produce these drawings e.g. Pro-Desk top. However the drawings do need to be refined, not simply produced by the package e.g. dimensions that are clearly not to scale or unrealistic.

It is sad to report that many candidates lost marks in this section as they failed to submit any form of working which would enable third party manufacture.

Criterion E

In the best cases in this section moderators saw well made products that used a range of different processes that allowed the candidates to demonstrate high level product manufacturing skills. This was a minority of cases. Much of the work lacked complexity and the range of skills and processes were somewhat simplistic, this resulted in the work of many centres being moderated down.

Centres must ensure that the candidates undertake projects that will allow them to demonstrate these high level and demanding manufacturing skills. Moderators must ensure that the candidates are clear that precision and accuracy are imperative at this level; a good example of this would be candidates producing architectural models that clearly lack any notion of scale.

Moderators did see a worrying trend towards the candidates using CAM to wholly produce the products, they therefore were 'untouched' by the candidates, these types of products also cannot demonstrate high level demanding making skills and so they would be moderated. In a number of cases this produced a reasonable reduction in marks. This issue is especially true in the case of Laser Cutting where the only other skill may well have been a simple assembly of the product. The level of inappropriate products was again slightly reduced but still in evidence.

Criterion F

The candidates in general handled this section reasonably well this is where moderators often see the client re-appearing, which is good practice. It is a pity that this use of the client is not always in evidence elsewhere in the portfolio. In general this section was accurately marked.

In the best cases the candidates used evidence gathered from the client and users to good effect to suggest modifications as well as devising tests that ensured fitness for purpose.

The weaker candidates failed to offer any tests of the product at all. This is an area that the candidates need to be guided on. The product must be tested and some feedback gained before conclusions are drawn. The product should also be tested against the specification; this is a fundamental element of the design process but was often omitted from this section of the portfolio.

Moderators are looking for the candidates to gather evidence, as to the success of the product. Objectively evaluate the product in the light of evidence and then suggest modifications or improvements.

Criterion G

This assessment criterion is much improved; moderators saw fewer inappropriate products across the submission. Those that moderators saw tended to be because of an over use of the resistant material or real pieces of furniture.

Criterion H

The moderators reported that this section was either well marked or that centres had simply awarded high marks to all candidates, therefore a number of these candidates were moderated down. Moderators must see the correct use of technical vocabulary, in the correct context with the correct spelling if they are to gain the highest award.

Statistics

			Grade Boundaries				
			A	B	C	D	E
Unit 6145	Raw marks	115	92	82	72	63	54
	UMS	150	120	105	90	75	60

			A	B	C	D	E
Unit 6146	Raw marks	80	49	43	37	32	27
	UMS	150	120	105	90	75	60

			A	B	C	D	E
Unit 6147	Raw marks	80	42	37	33	29	25
	UMS	150	120	105	90	75	60

			A	B	C	D	E
Unit 6148	Raw marks	115	92	82	72	63	54
	UMS	150	120	105	90	75	60

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