DESIGN TECHNOLOGY

Overall grade boundaries

Higher level

Grade:	1	2	3	4	5	6	7
Mark range:	0 - 15	16 - 27	28 - 38	39 - 50	51 - 62	63 - 74	75 - 100

Standard level

Grade:	1	2	3	4	5	6	7
Mark range:	0 - 14	15 - 26	27 - 35	36 - 48	49 - 61	62 - 74	75 - 100

Grade boundaries are determined by matching the Grade Descriptors for Group Four (see OCC) to the evidence available from marked scripts. Each paper is set in a way that ensures that it provides enough evidence to enable the use of the Grade Descriptors and also to ensure that there is appropriate syllabus coverage and that the papers are appropriately discriminating. Grade award meetings first determine the 3/4 boundary by inspection of the scripts for each component and matching with the Grade Descriptors, moving on to the 6/7 boundary and then the 2/3 boundary. Other grade boundaries are determined by interpolation from these three boundaries. The boundaries for Paper 1 are set with reference to the Paper 2 boundaries as the Papers 1 and 2 have the same syllabus coverage.

Introduction

The examining team continues to hope that the examination papers and this subject report will be useful for preparing candidates for future examination sessions, and will add to the material available to support teachers in their work.

Overall numbers of candidates and the number of schools has increased again compared with November 2006. There were 52 candidates (46 in 2006) from 10 schools at Higher Level and 20 candidates (15 in 2006) at Standard Level from 6 schools. Candidates were entered at both Standard and Higher Level in 5 schools. Though still small, it is gratifying to see the numbers continue to increase.

Only one G2 form was received for this examination. This was a disappointing response and makes it more difficult for the examining team to respond to any issues from teachers, and to ensure that papers are clear, unambiguous and consistently pitched at the right level. The G2 forms are extremely valuable in providing feedback to the examining team and are always studied carefully during grade award meetings.

The examining team continues to request teachers to feedback both positive and negative comments to inform the development of Design Technology. Where teacher comments are informed by candidate reaction to the papers after the examination this would be particularly useful.

Internal assessment

Component grade boundaries

Grade:	1	2	3	4	5	6	7
Mark range:	0 - 5	6 - 11	12 - 15	16 - 19	20 - 23	24 - 27	28 - 36

The range and suitability of the work submitted

The number of schools entering work for the November session continues to be in single figures. Moderated IA work ranged from small design and make activities through to laboratory based experiments. Those schools that are established in the teaching of IB Design Technology tend to do better when developing a course structure for IA, however established schools should still take note of the detailed project assessment criteria outlined on pages 36-41 of the subject guide.

Coursework should be used as a support exercise in order to help students understand the theoretical nature of the subject. Small lab based investigations tend to require less time than design and make tasks and the integration of such assignments into the course structure is to be encouraged. A typical lab based investigation can be conducted in 3 hours where a design and make activity is likely to take +10 hours.

As marks need to be highlighted on the form for each assessment heading, one of the marks must be for the design project and the other for any of the other investigations. All work that has been highlighted, along with evidence of the group 4 project, should be sent for moderation. Other elements of coursework are not required for moderation unless a teacher deems it appropriate. Flagging and annotating work to be moderated is to be encouraged.

In a number of schools there is still some confusion over what should be contained within the project report and logbook. The logbook is not formally assessed, but reference should be made to numbered pages throughout the folio if work is integral to the final report. Most samples were presented in an organized structure and clearly labelled.

Candidate performance against each criterion

P1(a): Most candidates seem to fare well in this section but common errors included a repetition of a problem set by the class teacher and the omission of any reference to constraints or variables. When using the design project assessment criteria, students should consider the feasibility of the study and produce a detailed specification.

P1(b): Most candidates displayed evidence of planning, but methods did not always control the variables. When considering the design project some candidates omitted a detailed plan of action and material list. Materials and processes must be included if students are to achieve a high mark under this heading. Gantt charts are to be encouraged, but time intervals must be realistic. Those who had written their plan in retrospect failed to address some of the assessment criteria. Evidence of ongoing work could be in the form of photographs and annotation. A Gantt chart can be used to plan an overview of student time for the design and make project, but planning for making must be considered in greater detail after development has been finalized.

DC: Smaller investigations where candidates had to collect 'raw' quantitative data offered ample opportunity to address the assessment criteria. The design project allows candidates to address research through identifying possible constraints and existing products, but some candidates had omitted essential data in order to solve the problem. Planning the collection of research data is to be encouraged and sources identified. Those that achieved a high mark in this section displayed evidence of focused research that had been annotated to indicate its relevance in order to solve the design problem and answer the analysis. Teachers should note that there is no need for pupils to include research which has no relevance to the final outcome. Not all candidates design ideas were supported by an initial evaluation.

DPP: The development of the chosen solution in the design project needs to be given greater emphasis when planning the IA structure. Most students omit the need to refine their chosen idea so as to include details regarding structure, construction, aesthetics, ergonomics, materials and suitable manufacturing processes. The use of modelling and evaluation is paramount to the success of the final outcome. Drawings and evidence of modelling should be presented in an appropriate format (orthographic drawings, photographs and CAD images). The use of CAD is to be encouraged. Some candidates developed their chosen idea by using a range of sketches and modelling, but in most cases the quality of working drawings did not offer sufficient detail for the product to be realized. Modelling using a wide range of materials is to be encouraged. Teachers should consider how card, manufactured boards, Styrofoam, etc. can be used to aid model development. Most candidates omitted the need to state 'final specifications'.

CE: In some cases, inadequate time had been devoted to completing a thorough evaluation/conclusion. Some candidates only offered superficial personal evaluations with no consideration being made to address the specification and suggest realistic improvements. Students should be encouraged to test their outcomes in the area for which they had been designed and suggest improvements in sketches. The more organised candidates did leave adequate time to address the criteria to a satisfactory standard. Most candidates omitted the need to state 'modified specifications'.

For lab-based investigations students should draw a conclusion to the stated hypothesis, evaluate procedures and state how the method of collecting data could be further improved.

Recommendations for the teaching of future candidates

IA should be integral to the teaching of subject content and students should be given appropriate time to complete work to a satisfactory standard. Teachers are advised not to try and conduct investigations where they have limited resources. Where workshop equipment is limited students may be better placed to consider a problem that addresses a need that will not need specialized resources. Small design and make activities generally require more time than lab based experiments, but are essential to develop the necessary skills to undertake the design project. The teaching of modelling to aid development is to be encouraged.

The use of the OCC and attendance at teacher training workshops is to be encouraged if teachers and students are to become more confident in the teaching of design technology.

Higher level paper one

Component grade boundaries

Grade:	1	2	3	4	5	6	7
Mark range:	0 - 10	11 - 12	13 - 15	16 - 19	20 - 23	24 - 27	28 - 39

General comments

One G2 was received related to HL Paper 1. It indicated that the paper was felt to be an appropriate level of difficulty compared with last year. The syllabus coverage was satisfactory, clarity of wording was deemed to be good, and the presentation of the paper was classified as good. No detailed comments were made.

The examining team is aware of the need to achieve the correct balance in setting multiple choice questions in Paper 1's. The questions must discriminate well between levels of knowledge of students, but not be so obvious as to be open to guessing. This means there is often only subtle differences between the responses, and sometimes there is more than one correct response, but one is 'more correct' than another. So while the questions may seem tricky, the goal is not to trick the students but to test their knowledge. Feedback from teachers about their perceptions of the questions is important.

The examining team also appreciates the reminder that many students do not have English as their first language. We often search for words and phrases that are the easiest to interpret and understand which is sometimes difficult in technology, but it remains a priority.

The mean for Paper 1 has been noted in past reports, and is included below in order to indicate the changes in means. The mean for this year was within an acceptable range of variation from year to year, and maybe indicates that the paper was a little easier than last year.

Mean	**Year**
23.4	2003
27.1	2004
27.2	2005
22.2	2006
23.3	2007

The table below indicates, in question order, how difficult questions were perceived to be as determined by candidate performance – the higher the difficulty index, the easier the question! The * shows the correct answer and the numbers represent the number of candidates providing each individual response. A discrimination index is also calculated. This compares the performance of the top 25% of candidates on a particular question with the top

25% of candidates overall and can vary between 0.00 and 1.00. With a small candidature the discrimination index is a less useful tool than it is in large entry subjects. All questions achieving a negative or low discrimination index are discussed at the grade award meeting.

Question	A	B	C	D	Difficulty Index
1	11	2	1	39*	73.58
2	34*	8	4	7	64.15
3	25	4	0	24*	45.28
4	0	7	44*	2	83.02
5	7	34*	2	10	64.15
6	3	2	46*	2	86.79
7	14	13	0	26*	49.06
8	12	9	6	26*	49.06
9	26*	13	8	6	49.06
10	46*	5	2	0	86.79
11	0	52*	1	0	98.11
12	22*	13	12	6	41.51
13	1	10	22	20*	37.74
14	35*	4	6	8	66.04
15	8	4	26*	15	49.06
16	4	5	13	31*	58.49
17	2	5	5	41*	77.36
18	3	4	38*	8	71.70
19	0	14	4	35*	66.04
20	0	52*	1	0	98.11
21	36*	5	7	5	67.92
22	27	10	13*	3	24.53
23	18	31*	4	0	58.49
24	3	0	2	48*	90.57
25	8	29*	12	4	54.72
26	18	20	14*	1	26.42
27	13	25*	8	7	47.17
28	15*	15	20	3	28.30
29	15	12*	2	24*	67.92
30	15	7	12	19	0
31	0	42*	3	8	79.25
32	4	2	41*	6	77.36
33	5	33*	9	6	62.26
34	17*	13	11	12	32.08
35	2	6	45*	0	84.91
36	4	4	41*	4	77.36
37	6	11	2	34*	64.15
38	3	30*	15	5	56.60
39	3	8	36*	6	67.92
40	39*	3	3	8	73.58

As is normal practice, the questions with the lowest Difficulty Index, and a low Discrimination Index were analysed by the examining team. For a number of the questions, a low Discrimination Index was because the question was an easy question and the majority of candidates chose the correct response, for example Q 10, 11 and 20. Other questions are discussed below.

Q12: the majority of candidates selected the correct answer A. Lamination, but significant numbers selected options B. Extrusion and C. Sintering. These are not correct options because both involve pressure and temperature considerations in the design of a mould, whereas the construction of a mould for lamination could be quite simple and inexpensive.

Q22: the majority of candidates selected the incorrect option A. Wrought iron for this question, possibly because of the link that is made in the guide between wrought iron and an expansion in engineering. However, the first bridges were made from cast iron, and wrought iron was a later historical development.

Q29: the majority of candidates selected option D. increasing stiffness, whereas B. Increasing hardness was considered the correct answer, as is indicated in the Guide Topic 8.4. However, upon further research, some metals when alloyed, do become stiffer. The examination team therefore decided to accept both B. and D. as correct responses to this question.

Q30: candidates responses to this question were spread across all options. While the qualities of a polyurethane are particularly appropriate as an addition to paint (Option A), other forms of polyurethane have a range of applications, including for example packaging and cups. The examination team therefore decided to delete this question from the computation of scores for this paper.

Q34: while more students selected the correct option (A. Nm^{-2}) for this question than any other option, a negative Discrimination Index was computed because the other responses were evenly distributed across options B, C and D, but they are not the correct unit of measurement.

Higher level paper two

Component grade boundaries

Grade:	1	2	3	4	5	6	7
Mark range:	0 - 6	7 - 13	14 - 21	22 - 29	30 - 37	38 - 45	46 - 60

General comments

No G2's were received for this paper.

The strengths and weaknesses of the candidates in the treatment of individual questions

Section A

Each question within Section A is separate and does not assume understanding from previous questions. The use of parts (a), (b), (c) and sub-sections (i) and (ii) should provide some sign-posting to candidates about the structure of the question and the shift from one focus to the next. It is by no means clear that all candidates understand the significance of this. Teachers must continue to emphasise this to candidates and encourage them that if they falter on one part of Section A for whatever reason they should carry on with other parts which will explore different issues.

Question 1

Question 1 is a data question about details of the Three Gorges dam.

Parts a(i) and a(iii) posed no significant problems for candidates, although fewer received full marks for the more complex a(ii) question.

Most candidates received full marks for question 1b(i), the most common error being to add the dimensions rather than subtract them. In 1b(ii), those who did not know the answer related factor of safety to the workers on the dam project rather than the dam design.

Some candidates in 1c(i) stated general advantages and disadvantages rather than relating them to sustainability, probably a result of not studying the question properly. Similarly in question 1c(ii), the answers needed to be related to economic reasons. Same candidates provided economic/sustainability reasons, but received full marks if they made the economic cost clear.

A range of answers were acceptable in 1d depending on how candidates interpolated the graph, but if they simply stated the answer they only received 1 mark, and indication of logic was required for 2 marks.

Candidates had little difficulty in completing 1e, although in part (ii) the working was required for full marks.

Some candidates confused expansion with conductivity in 2a. There tended to be a high proportion of rambling rather than well structured answers for 2b, but most candidates received 1-2 marks.

About half the candidates knew the manufacturing technique to produce nylon in 3a. In 3b many candidates discussed the characteristics of nylon ski jackets rather than focusing on the cost effectiveness of production.

Few candidates were able to list two materials in 4a, though most received 1 mark. Most candidates successfully answered 4b.

In question 5a, many students listed generalities (for e.g. ‘a type of divergent thinking’) rather than specific characteristics of brainstorming.

Some candidates provided the same answer for 6a and 6b, not knowing the difference between a definition and characteristics of appropriate technology.

Section B

Parity of Section B questions and syllabus coverage remain conflicting constraints. The examining team continues to try hard to produce equally difficult questions whilst achieving syllabus coverage. The majority of candidates chose to answer Question 9.

The extended response question in Section B continues to be a good discriminator. With some candidates it remains clear that they do not approach their answer in a logical and structured manner. If three points are requested, then three subheadings or paragraphs should be clear in the answer. Even candidates who do well in the shorter answer questions but do not provide an organized answer to this question lose marks. Teachers need to provide students with guidance in this area.

Question 7

All candidates received at least 1 mark for question 7a (i) and most achieve full marks. Most candidates understood the corrosion resistant nature of stainless steel and so achieve 2 marks for 7a (ii).

There were some very elaborate answers for 7b (i), candidates who knew the topic well wanted to write all they could about it rather than just making the points necessary for 2 marks. Question 7b (ii) was generally well answered.

In 7c(i) most candidates referred to liner chains and about half the candidates also discussed secondary bonding. Question 7c(ii) was quite well done, with many candidates organizing their answer well into three sections.

Question 8

Many candidates struggled to outline an advantage of injection moulding for car body panels in 8a (i). In 8a (ii) most candidates made the link to the weight of materials and consequent fuel consumption. Candidates seemed confused with 8a(iii), many discussing plastic as a material and others discussing the behaviour of steel in a crash.

Most candidates answered the questions 8b without difficulty.

There were some excellent answers for the longer question, 8c(ii) which achieved full marks which is uncommon. These candidates indicated three clear sections in their answer and related each to sustainable development.

Question 9

Candidates generally performed well in all three questions in 9a.

In question 9b (ii) most candidates had an idea about expert appraisal but they didn't identify who the experts might be to receive full marks.

Candidates did not answer 9c (i) well, struggling with the application of ergonomic principles to a school context. Those candidates who knew the psychological factors were generally able to discuss them in terms of the school interior. Most answers were well organized under three headings.

Higher level paper three

Component grade boundaries

Grade:	1	2	3	4	5	6	7
Mark range:	0 - 5	6 - 10	11 - 14	15 - 19	20 - 25	26 - 30	31 - 40

General comments

No G2's were received for Paper 3.

Candidates seemed well prepared for the extended response questions and provided balanced and well organized answers. For those candidates who knew their content reasonably well, marks were lost for two main reasons:

- not reading and understanding the question well,
- not structuring their extended answers.

It was noticed again that where candidates go onto an additional sheet to answer the extended response question that it is only those candidates who were using a framework to structure their answers who were picking up marks on the additional sheets. Again, volume is no indicator of quality!

There was no indication of any differences in performance across the two most popular options, particularly in the extended response question, which is pleasing. Overall the Paper 3s produced a good spread of marks and reasonable discrimination was achieved.

In teaching the options teachers are advised not to leave the options to last but to incorporate the option into the core and particularly into the practical work so candidates have some 'hands on' experience of the option in order to both broaden and deepen their understanding, and more effectively enable their application of content to a range of contexts.

The trend continued in this paper with most candidates choosing Options E and F. Options D, G and Option H were selected by only 1-3 candidates.

The strengths and weaknesses of the candidates in the treatment of individual questions

Option E

Many candidates answers for 1(a) related to production rather than design, but most received 1-2 marks. 1b was answered well.

Some candidates struggled with question 2, but those who clearly understood the nature of a CIM system achieved the 2 marks.

Broad coverage was the most common correct answer for question 4, and some candidates knew the answer but did not outline it for the extra mark.

There was a dichotomous answer pattern for question 5: some candidates discussing three strategies and achieving high marks, and at the other extreme, those who knew very little and receiving 1-2 marks, but few candidates in between. It was difficult to get marks from a general discussion.

Option F

Those candidates who could describe a reason for diffusion into the market received 2 marks for question 1(a) and those who listed a reason rather than describe it received one mark. Some candidates knew about market diffusion, but did not relate their answer to jeans and so did not achieve full marks. Most candidates received full marks for 1(b) as it could be deduced from the introduction to Figure F1.

The majority of candidates achieved good marks in questions 2 and 3, though there seemed to be some guessing related to the idea of 'imitative'.

In question 4 many candidates seemed to provide a lot of 'hit and miss' answers – they didn't really know but had a go. Some candidates related the idea of robust to the toughness of jeans.

Some candidates in question 5 achieved some marks through a general discussion of market research, but the answer needed to be related to the global context in order to achieve full marks. Many candidates wrote an introduction to their answer in which they provided an advanced organizer for their answer or in which they repeated the question. This is generally not worth while and a waste of time as they do not get any marks for this type of introduction.

Standard level paper one

Component grade boundaries

Grade:	1	2	3	4	5	6	7
Mark range:	0 - 7	8 - 9	10 - 11	12 - 16	17 - 20	21 - 25	26 - 30

General comments

No G2's were received for this paper.

The mean for Standard Level Paper 1 has been noted in past reports, and is included below in order to indicate the trend in means, the 2007 mean being within an acceptable range compared with the last few years.

Mean	**Year**
15.6	2003
18.8	2004
19.8	2005
18.3	2006
19.0	2007

The table below indicates, in question order, how difficult questions were perceived to be as determined by candidate performance – the higher the difficulty index, the easier the question! The * shows the correct answer and the numbers represent the number of candidates providing each individual response. A discrimination index is also calculated. This compares the performance of the top 25% of candidates on a particular question with the top 25% of candidates overall and can vary between 0.00 and 1.00. With a small candidature the discrimination index is a less useful tool than it is in large entry subjects. All questions achieving a negative or low discrimination index are discussed at the grade award meeting.

Question	A	B	C	D	Difficulty Index
1	4	2	0	14*	70
2	3	4*	10*	3	70
3	9*	4	2	5	45
4	0	15*	2	3	75
5	7	1	1	11*	55
6	3	4	13*	0	65
7	1	0	18*	1	90
8	2	13*	0	5	65
9	11*	6	2	1	55
10	17*	0	0	3	85
11	1	0	19*	0	95
12	4	6	1	9*	45
13	5	8*	6	1	40
14	6	2	3	9*	45
15	8*	5	1	6	40
16	11*	5	2	2	55
17	0	17*	1	2	85
18	1	2	10*	7	50
19	10*	3	2	5	50
20	1	17*	1	1	85
21	1	6	6	7*	35
22	10*	2	5	3	50
23	5	4	6*	5	30
24	2	0	6	12*	60
25	1	0	16*	3	80
26	1	5	3	11*	55
27	1	1	17*	1	85
28	2	4	0	14*	70
29	1	18*	1	0	90
30	2	15*	1	2	75

It is obvious that with such a small number of candidates that the Difficulty Index and the Discrimination index are of limited use. This is at least partly evidenced by the high number of questions (14) with a low discrimination index. However for many of these questions, the index is low because it was an easy question, that is, a high proportion of candidates selected the correct answer, for example in Questions 7, 10, 11 and 29. A number of the other questions are commented on below.

Q2: this was the only question in the paper in which more candidates selected a single incorrect answer than the correct answer. The intended correct answer was B. Mobile phone, because mobile phones represent a completely new way of communicating when compared with landlines. However, many students interpreted C. Microwave oven in a similar way, in terms of being a completely new way of heating food. The examination team consequently decided to accept both B. and C. as correct answers.

Q12: while the majority of candidates selected the correct answer, a number also selected B, presumably interpreting the question to be about batteries rather then torches, and the effect batteries have on the environment. It is interesting to note that this question in the HL paper was not problematic.

Q13: while the majority of candidates chose the correct answer B. Ceramics (earthenware, porcelain, stoneware) as a response to the clear teachers note under Topic 3 Materials in the Guide, a number of students selected options A. Timber (natural and composite) and C. Food (vegetable and animal).

Q14: again, the majority of candidates selected the correct answer D. Tensile strength, a significant number selected option A. Hardness, which is a property relevant to bread as it should not be too hard.

Q15: it would seem that the candidates incorrectly selecting answers B, C and D were inadequately familiar with the materials and properties matrix in the Guide.

Q18: the second most commonly selected answer to this question was D. Lamination, but the examining team is not aware of a metal and ceramic composite being used in a lamination process. Only C. Sintering then remains the correct answer.

Question setters use a grid to develop Paper 1 and allocate questions to topics according to the hour weightings as identified in the Guide (see Appendix 1).

Standard level paper two

Component grade boundaries

Grade:	1	2	3	4	5	6	7
Mark range:	0 - 4	5 - 9	10 - 12	13 - 18	19 - 23	24 - 29	30 - 40

General comments

No G2's was received for this paper.

The examining team is conscious of the importance of ensuring that all the language used in all papers is accessible to all candidates to ensure paper validity, and we will continue to have that focus.

Although teachers cannot directly 'teach' the contexts covered in Section A Question 1, they can use past papers to expose students to this type of question and emphasize the importance of attention to detail, e.g. always including units with the answer to calculations and showing essential working.

Teachers need to continue to encourage candidates to persist with all sections of each question. A number of weaker candidates appeared to have difficulty with the first parts of a question and then not persist with the remainder of the question. Mark allocations and the action verbs are important indicators of the nature and extent of expected answers. It is worth teachers emphasising this to candidates.

In general candidates made a good attempt at the paper. As has been the case in the past, it was pleasing to see that better candidates had structured their answers according to an understanding of the action verbs and the marks awarded for the question.

The strengths and weaknesses of the candidates in the treatment of individual questions

Section A - Question 1

Most candidates correctly completed 1a(i). Many candidates in 1a(ii) incorrectly referred to rot and deterioration as disadvantages of storing during winter.

Many candidates did not correctly complete the calculations involved in 1b. In 1b(i), many did not include the top thickness of 20mm, so they may still have received one mark if this was the only error made in the calculations. In 1b(ii), many forgot to add the 40mm allowance for the seam in computing the length of fabric required.

In 1c(i), a number of candidates copied their answer from the stem of the discussion of Figure 1: 'so that the customer can apply one or more surface treatments'. However this was not enough for 1 marks, as an answer to 'why' was required.

Most candidates cited structural deterioration as a disadvantage in 1c(ii), but this had to be related to safety in order to receive a mark.

Section A - Question 2

Most candidates noted one element of clean technology to get one mark in 2a.

A common answer for 2b was related to legislation, but this was inadequate for 3 marks without further explanation as a response to legislation is generally reactive rather than proactive.

Section A – Question 3

Few candidates correctly listed 60 degrees as the answer to 3a, most stating 30 degrees, and it would seem not thinking adequately about the plane relationships in the question.

Most candidates received at least 2 marks in 3b by including at least 2 functions of exploded isometric drawings in their explanation.

Section B

In this section, the extended response question is the most significant and a major challenge to many candidates and some preparation is needed for this. A framework for answers helps guide candidates towards a balanced answer and the achievement of a good mark. Planning helps and, for candidates who clearly thought about their answer and jotted down some notes on the question paper, there was the reward of a well-structured answer. Many candidates answer as ideas come to mind rather than answering the questions as set. Such answers are extremely difficult to mark and whilst examiners search hard for anything relevant, it is often very difficult to find anything that corresponds to the required material. Bullet points rather than an essay helps organise a response and candidates using such devices generally achieve higher marks by being able to identify clearly different points in their responses related to the marks available.

Unlike the formatted answer sheets in Section A, candidates have no guidance provided for the length of answer, and long answers rarely achieve more marks. There seems to be an optimum length of answer for the marks achieved of 1-3 lines for each mark, the shorter answers being dot points rather than prose, which is quite acceptable.

Section B - Question 4

While most candidates correctly responded to a(i), and a(ii), stating one advantage and one aesthetic consideration related to the bridge.

4b was not well answered, with candidates seeming to have vague ideas about the nature of ductility.

Most candidates correctly listed 2 uses of physical models in 4c(i), although some discussed the testing of stresses and forces through the use of the model. In 4c(ii), most candidates discussed the importance of R&D, but in order to achieve the full 3marks, this needed to be related to the design cycle.

4d was not well answered. For 9 marks candidates should have organized their answer into 3 sources of conflict, making 3 points under each area. Some candidates discussed form separately from function and consequently received some marks, but for full marks, the conflict between the two needed to be explained.

Section B - Question 5

Only 2 candidates selected this option, and both achieved reasonable marks.

Section B - Question 6

This question was the most commonly answered by candidates.

Questions 6a (i) and (ii) were answered well, most achieving full marks. The reason why 6a(iii) was not answered as well was because a number of candidates listed 2 reasons for a transparent water tank rather than described one in more detail.

In 6b (i) most candidates were able to list at least one property of thermoplastic for 1 mark. In 6b (ii) most candidates had a rough idea of why the body is produced from a thermoset plastic and so received 1 mark, and those who could elaborate on that reason received the full 2 marks.

In 6c candidates tended to either receive no marks or the full 2 marks related to batch production.

Most candidates were able to structure their answer well to 6d, making 3 points under the 3 headings of reuse, recycle and repair. Although some of the specific examples were a bit impractical, they generally indicated an understanding of the strategy and so received marks.

Standard level paper three

Component grade boundaries

Grade:	1	2	3	4	5	6	7
Mark range:	0 - 3	4 - 6	7 - 8	9 - 12	13 - 16	17 - 20	21 - 30

General comments

Again the format for each of the Paper 3 options is that question 1 is a database question providing a stimulus and context for the question. The last question in each option is an

extended response question worth 6 marks to provide a better opportunity for candidates to demonstrate their understanding. It is through the extended response question in particular that the more able candidates can demonstrate their ability and discrimination between levels of candidates can be determined.

No G2's were received for this paper.

Options A, C, E and F were each attempted by about 20% of the candidates. Options D and G were attempted by 3 candidates each, and the mean score for these candidates were 6.3 and 5 respectively. As in 2006, no candidates again attempted Options B and H.

The strengths and weaknesses of the candidates in the treatment of individual questions

Option A

Most candidates were successful in 1(a). Those candidates who had an understanding of particle board did well in (b).

A common error in question 2 was to list two reasons for treating the doors rather than describing one reason, resulting in most candidates receiving 1 mark.

Again in question 3, the most common error amongst candidates was to list some reasons for making the sink from stainless steel rather than selecting one reason and elaborating on it for an outline.

Candidates answering question 4 tended not to be well organized in their answer and consequently found it difficult to score high marks.

Option C

Question 1(a) was not well answered, it seemed as though many candidates could not apply the characteristics of appropriate technology to the straw bale house.

The majority of candidates received 1-2 marks for 1(b), but few received all 3 marks which required a deeper discussion of one specific way resources could be conserved.

Few candidates appeared to encounter any problems answering questions 2-3.

In answering question 4 many candidates developed a general discussion, rather than a well organized explanation of how market pull (3 points for 3 marks) and technology push (3 points for 3 marks) could result in an increase in sustainable houses.

Option E

Many candidates answers for 1(a) related to production rather than design, but most received 1-2 marks. 1b was answered well.

Some candidates struggled with question 2, but those who clearly understood the nature of a CIM system achieved the 2 marks.

Some candidates listed advantages for consumers rather than manufacturers in their answer to question 4. Some provided inadequate explanations, for example higher profits, but did not indicate why and so did not achieve full marks.

Option F

Those candidates who could describe a reason for diffusion into the market received 2 marks for question 1(a) and those who listed a reason rather than describe it received one mark. Most candidates received full marks for 1(b) as it could be deduced from the introduction to Figure F1.

The majority of candidates achieved good marks in questions 2 and 3.

In question 4 many candidates received 3-4 marks by listing some criteria, but missed out on full marks by not providing an adequate explanation of the 2 criteria.

Conclusion

The increase in the candidature for the subject continues to be a pleasing feature. Congratulations to all candidates on their success and to teachers in facilitating this success.

The understanding of the action verbs (e.g. state, list, outline, describe, explain – see pages 8 and 9 of the Guide) seems to be continuing to increase in relation to required responses to questions. It also seems that more candidates are recognising the significance of the mark weighting in relation to the expectations of the answer, though there are still some candidates who do not use this link. Familiarity with the way that the paper is constructed and particularly the way that action verbs signal expectations is an important part of candidate preparation and cannot be over-emphasised.

Teachers should continue to stress the importance of 'sign-posting' answers with headings and bullet points or using tables to identify distinct points. Candidates should also be encouraged to confirm their understanding of the extent of the answer required by checking the mark allocation for the question.

Teachers should continue to familiarise themselves with the Group 4 Grade Descriptors (see OCC). The examining team continues to strive to:

- ensure appropriate syllabus coverage;
- use accessible design contexts understandable around the globe;
- ensure parity between optional questions;
- make the expression of questions as straightforward as possible (particularly for second language candidates);
- ensure that the various examination elements discriminate appropriately between stronger and weaker candidates
- ensure that there are opportunities for candidates to provide evidence for the different aspects of the Group 4 Grade Descriptors within the examination papers to enable the Grade Descriptors to be used in the setting of the grade boundaries at the Grade Award meeting.

Teachers are encouraged again to contribute comments on the papers through the G2 Form and so assist in the continued development of DT as a relevant, practical and worthwhile subject within the curriculum.