

November 2015 subject reports

Design Technology

Overall grade boundaries

Higher level

Grade:	1	2	3	4	5	6	7
Mark range:	0 - 14	15 - 27	28 - 38	39 - 50	51 - 61	62 - 72	73 - 100

Higher level internal assessment

Component grade boundaries

Grade:	1	2	3	4	5	6	7
Mark range:	0 - 8	9 - 17	18 - 25	26 - 31	32 - 36	37 - 42	43 - 60

The range and suitability of the work submitted

The work submitted covered a wide range of investigation and design projects. These were appropriate and able to meet the requirements of the criteria although in some cases there was evidence of excessive teacher guidance. This excessive guidance limited the opportunity for candidates to explore open-ended design problems and did not provide sufficient scope for innovation.

There was a pleasing amount of teacher advice on how the work had been marked that explained the rationale behind the awarding of marks.

Most teachers also seemed to understand the requirement of the syllabus.

Candidate performance against each criterion

Planning

The candidates' identified appropriate design problems, although some of them seemed very

teacher led. There was a general lack of investigative research into a focused problem to provide a solid foundation for the project. The Design Brief and Design Specifications were often generic and unrelated to the research.

Research

Research strategies were often limited with insufficient data to fully address the brief. They were often teacher directed with a template structure and candidates using the same in both the investigation and design projects. The collection of data was often Internet based with a lack of focused data to help with the designing. Little raw data analysis was evident.

Development

There was little originality in the designs developed for many of the ideas. Most candidates lacked sketching skills and often relied on CAD to present their ideas which was not always appropriate.

There was a general lack of design development leading to a final solution; in particular, modelling and testing. Orthographic drawings were used but many were informal. Detailed drawings are required to allow realization to take place.

Evaluation

A few candidates were still evaluating without a finished product or using a scale model.

If the intended product is not tested, the effectiveness of the evaluation is severely hampered.

Most candidates were evaluating the procedures involved in developing the product. However, some candidates were still producing a paragraph with self-improvement unrelated to the actual product.

There was a general lack of modifications to the product relating to test results therefore realistic recommendations were limited together with further developments such as scaling up the production of the product.

Recommendations for the teaching of future candidates

To achieve the highest marks it is necessary to allow the candidates to challenge themselves with open-ended projects and without cloned templates for specifications and research.

With the transition to online submission and moderation from November 2016 the clear presentation of the Design Project in on screen friendly format is essential. Candidates should follow guidelines similar to those for the Extended Essay about good practice when presenting their work. Many of the following comments are designed to facilitate the straight forward online moderation of the Design Project.

For the new Criterion A, the extended writing linked to the research needs to be focused and utilise higher order skills such as synthesis and evaluation. Excessively extended text is moderator unfriendly not only because scrolling increases the memory burden of the moderators, but in order to fit it to the page limit requirements the candidate can end up removing the white space making it hard to see where one idea stops and another one starts.

There needs to be a clear focus to the Design Project, not only in the explanation of the problem that leads to the design opportunity, but also in in Criterion A, and especially in the Design Brief. In most cases, less is more.

Sources need to be acknowledged and cited appropriately, as they would be in the Extended Essay or other DP subjects. Where possible the appropriateness of the sources should be evaluated or commented on

For the Higher Level Design Project candidates will need to make explicit links to Criterion E and Criterion F throughout the Design Project and consider these criteria when deciding on the product they intend to develop.

Higher level paper one

Component grade boundaries

Grade:	1	2	3	4	5	6	7
Mark range:	0 - 10	11 - 15	16 - 21	22 - 25	26 - 29	30 - 33	34 - 40

General comments

The discussion about Paper 1 in the Grade Award meeting focuses on the student statistics and any G2s. Only one G2 was received for this paper, which did not highlight any question-specific issues. However, one question-specific issue had been highlighted pre-meeting in relation to question 14.

14. What are superalloys resistant to?

I.High temperature

II.Oxidation

II. Creep

A. I and II

B. I and III

C. II and III

D. I, II and III

Instead of denoting the options as I, II, III, it incorrectly denotes them as I, II, II. Clearly this is an error and for this error we are most sorry. Most candidates (57) answered D, presumably reading the second II as III. 29 answered A. The award team decided that the best resolution to this issue was to take both A and D as correct answers and to give the candidate the benefit of doubt.

Further Comments

No further issues were noted or discussed.

Higher level paper two

Component grade boundaries

Grade:	1	2	3	4	5	6	7
Mark range:	0 - 6	7 - 12	13 - 16	17 - 23	24 - 30	31 - 37	38 - 60

General comments

Section A of the exam paper was more loosely connected to the Design Technology syllabus than in previous sessions and allowances were made in the boundary setting exercise for this paper.

In Section B, Question 7 was by far the most popular question. All of the three questions in this section were reasonably well answered.

The areas of the programme and examination which appeared difficult for the candidates

Candidates appeared to have difficulty in the following areas:

- There was limited technical knowledge, e.g. knowledge of gear trains was very poor as was properties of materials.
- Only a few were able to calculate the value in Q1aiii).
- Only a few appreciated the conversion of energy during a kite flight.
- There was a limited understanding of the term 'extrapolation' in Q1bii).
- The term 'dominant design' also appeared difficult for many candidates.

The areas of the programme and examination in which candidates appeared well prepared

Candidates seemed well prepared in the concepts of sustainability and environmental issue

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

SECTION A

- Q1 a) (i) It was felt that the original markscheme response was limited and was updated during standardisation meeting. This reflected the responses of the majority of the candidates who focussed on PC Hard drive technology and improvements in DVD capacity. Benefit of doubt was given to the candidates in this case.

- (ii) Most candidates managed to get this right.
 - (iii) Many candidates failed to realise that the question was looking for an answer in bytes and instead gave the answer as a percentage.
- b)
- (i) Most candidates [successfully] went for the hard disk capacity answer.
 - (ii) The vast majority of candidates had trouble with this question, those that were on the right track failed to appreciate the time factor.
- c)
- (i) Most candidates answered this correctly.
 - (ii) Many candidates described planned obsolescence as a strategy of manufacturers for increasing profit. Few, if any, gained the full three marks.
- d)
- (i) Many candidates offered surveys and questionnaires as a response.
 - (ii) This question was generally poorly answered. Many candidates gained a mark for purchasing habits, but failed to point out spending/income or types of products/lifestyle.

Age, gender and trends was offered and accepted. Perhaps candidates had problems with the term 'extrapolated'.
- e)
- (i) Many candidates failed to get the two marks available for this question. Most went for the option of special offers available to loyalty members, but little in the way of an explanation.
 - (ii) Many candidates felt that the security of the card was an issue if it was stolen, with sensitive data being available to misuse, they missed the insecure storage of the data so the response was not accepted.
- Q2
- a) A very small percentage of candidates answered this question correctly. A few mentioned kinetic and potential energy but unfortunately the wrong way around.
 - b) Many candidates referred to nuclear energy as renewable. Many stated nuclear energy emitted zero CO₂, this was accepted, no candidate referred to geographical location.
- Q3
- a) This was a very poorly answered question, it was apparent that the majority of candidates had only a vague idea of the concept of gears.
 - b) The same comments apply as for Part a.
- Q4
- a) This was surprisingly poorly answered by the majority of candidates.

- b) Most candidates appreciated the intricate detail available with the process as well as the smooth finish. Fewer appreciated the volume production aspect.
- Q5 a) This question was poorly answered by the majority of candidates. Many thought the process was suitable for mixed or many different materials, only one mentioned thermoplastics.
- b) This question was surprisingly poorly answered by the majority of candidates. Many selected PVA or PVC. Epoxy resin or resin was accepted.
- Q6 a) Many candidates offered the 5th - 95th percentile as the correct response.
- b) Many candidates described how peoples living in different (hot & cold) regions of the world would differ in their appreciation of what is thermally comfortable. Most went for clothing and physical activity as well as exposure to sunlight/ac.

SECTION B

Q7 was by far the most popular question.

- Q7 a) (i) Only a few candidates gained to two mark for this question. Many felt that because the chair had all the attributes of a chair it was dominant design.
- (ii) Most candidates were able to answer this question adequately.
- b) (i) Most candidates were able to answer this question adequately.
- (ii) Many candidates had difficulty with this question. Many mentioned how the new version offered a variety of colours and this was accepted.
- c) (i) Many candidates felt friction welding was a correct response for this question.....
- (ii) Seat Base: most candidates described how leather provided support, but failed to appreciate the different thicknesses available. Many described how leather can stretch/deform to offer support.

Seat Cushion: Most appreciated the properties of leather and plastic foam as strong but none mentioned the density of the foam as a factor.

Steel Frame: Most appreciated the strength and stiffness of the steel as a factor, a few mentioned there would be little deflection.

- Q8 a) (i) Most candidates appreciated the promotion and environmentally friendly aspects of

- (ii) Only a few candidates appreciated the imitation of the bottle as incremental design. More discussed the use of different colours as radical and very few mentioned the use of plastic.
- b) (i) Most candidates offered injection moulding as the correct technique, but a far smaller percentage were able to explain the benefits of using this technique.
- (ii) Very few, candidates managed to gain three marks for this question. Many grasped the appeal to eco-fans, few mentioned market development.
- c) (i) Few candidates gained two marks for this question. Most appreciated how the plastic can be recycled OR has a long life cycle.
- (ii) Economic: Most candidates appreciated the sharing of the technology and contribution to country's economy.

Environmental: most mentioned the positive aspect of using recycled plastic. Few appreciated the landfill/reduced resources aspect.

Social: No candidate mentioned how injection moulding can allow for cultural identity to be built into the design. Many mentioned the sharing of technology aspect but did not state it was an example of accessibility, simply re-stated the economic benefits of this.

- Q9
- a) (i) Most candidates appreciated the eco-friendly aspect of the design and promotion of healthy products. Few discussed school targeting.
 - (ii) This was a poorly answered question, it appeared that candidates had little understanding of the term 'technology push'.
 - b) (i) Only a few candidates stated field trial, and most offered weak explanations.
 - (ii) Most candidates appreciated the difficulty in handling a flexible pouch as opposed to a rigid can. Many mentioned that the liquid would be easily spilt when the pouch was squeezed.
 - c) (i) Most candidates answered this correctly. The two marks were awarded as one for mentioning flash chilling and one for stating that it requires large amounts of energy.
 - (ii) Packaging: a few candidates appreciated that less packaging was required, very few appreciated the weight aspect or energy used to manufacture.

Transportation: Many candidates appreciated the self-cleaning aspect led to energy savings due to less visits by the company.

Storage: many candidates appreciated the ability to store many pouches in one machine and the energy savings here.

Water: Most candidates recognised the fact that water is only used when needed and comes from the mains rather than bottled. Many felt that the pouch could be reused for other drinks! Some mentioned energy savings since the drink is flash chilled when bought and not kept cool continuously.

Recommendations and guidance for the teaching of future candidates

Candidates should be given more guidance on simple machines and properties of materials.

Teachers should study the new format of Paper 2, which is a common paper for Standard Level and Higher Level candidates. This is exemplified in the Specimen Papers that are available on the OCC. The papers from the May 2016 examination session will place a greater emphasis on the application of knowledge than the previous Design Technology course.

Higher level paper three

Component grade boundaries

Grade:	1	2	3	4	5	6	7
Mark range:	0 - 4	5 - 9	10 - 13	14 - 19	20 - 25	26 - 31	32 - 40

General comments

Overall, Option E was the most popular option, closely followed by Option C. There were a few responses to Option A and D – far too few to make any meaningful comment, and none from Options B. Therefore this report will concentrate on Options C and E.

A repeated general comment that can be made about candidate performance from previous sessions is that too many times the detail in the stem of the question is ignored e.g. outline one advantage, or the focus is missed e.g. manufacturer.

Many candidates continue to waste time (and space within the answer box), repeating the stem of the question. They would be better advised to answer the question directly and avoid writing outside the allowed space.

The responses to the extended questions have improved, with candidates managing to address the required number of points in their answers. Repetition in explanations remains a problem

however, as does understanding the technical aspects of some questions, which in many cases offsets this improvement.

The areas of the programme and examination which appeared difficult for the candidates

Many candidates had a reasonable knowledge of the content required for this paper, but often lacked the technical knowledge to access the higher mark ranges. There were clearly gaps in knowledge exhibited by some candidates e.g. FDM, material characteristics, ergonomics as opposed to anthropometrics, torque.

The areas of the programme and examination in which candidates appeared well prepared

Candidates maintained the ability to make good observations, from a general knowledge standpoint, about many of the topics focused on in the questions.

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

OPTION C

- Q15 The advantages of FDM were not readily known, with many candidates purely attempting to explain the process.
- Q16 This question was well answered by the majority of candidates.
- Q17 Whilst part (b) was well answered, many candidates could not give a coherent reason for the need for a wider range of knock down fittings in flat-pack furniture that generally uses man-made timbers.
- Q18 This was a 6 mark question, where a lack of structure to the answer led many candidates to repeat themselves, focusing mainly on redundancy or profit.
- Q19 This question was reasonably well answered by the majority of candidates, although in part (c), the explanation was often missing.
- Q20 Part (a) was well answered, but in part (b) there was a lack of understanding of what was meant by 'characteristic of a material'.
- Q21 The scenario addressed by this question was generally well understood by most candidates. The structuring of the answer to access the highest mark ranges still remains a difficulty in some cases, with repetition or irrelevant comments losing marks.

OPTION E

- Q29 Part (a) was well known, but (b) was disappointingly answered by many candidates. Most ignored the fact that the model is used with 2D drawings.
- Q30 Part (a) was well answered, but in part (b) the majority of candidates did not understand the term 'pressure management', often referring to 'tyre pressure'.
- Q31 Candidates tended to answer this question from 'general knowledge', not clearly understanding the term 'air velocity' or how 'legislation' is used.
- Q32 Many responses ignored the 'anthropometric' focus of this question and purely discussed the influence of 'technological' improvements'. The lack a relative scale between the illustrations may have affected their understanding of what was required to some extent.
- Q33 Part (a) was well answered, whilst the technical explanation of the impact of torque in part (b) was less so. In part (c), the majority of candidates could not outline a 'psychological human factor', referring mainly to 'loss of pride' if they failed to open the jar.
- Q34 This question was well answered at a superficial level, but many candidates failed to gain 3 marks because of a repeating the same ideas within the response.
- Q35 This extended response question was reasonably well answered. However, marks were lost for 'describing' rather than 'comparing' the use of the materials.

Recommendations and guidance for the teaching of future candidates

Apart from the comments already made regarding the need for deeper technical knowledge of the subject content, teachers should strive to maintain the improvements noted in enabling their candidates to access the higher mark ranges in the two extended response questions (6 & 9 marks each). Repetition is the major enemy when attempting to address the required number of issues.

Once again, it must be noted that the skill of reading the question is one that teachers should focus on in preparing candidates for the examination.