



General Certificate of Secondary Education

**Design and Technology:
Product Design**

3544H Written Paper

Report on the Examination

2007 examination – June series

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Dr Michael Cresswell Director General.

3544H Design and Technology Product Design

Principal Examiners Report

General comments

The examination papers have settled into a common format and centres appeared to have prepared candidates well for the examination using previous papers. Examiners reported that most candidates were able to attempt most of the questions on both papers. With a few common exceptions, the papers were generally well answered with most candidates demonstrating a good understanding of the various topics associated with product design. It was felt that papers were generally more accessible to candidates this year, however, that has led to some very superficial answers which failed to attract the higher marks. There appeared to have been far fewer misunderstandings this year and the basic terminology used in the papers was helpful to most candidates.

It might be significant to report that AQA have provided increased support to centres this year in the form of one-day workshops and around 200 centres have attended these. The notion that the whole subject content needs to be taught to gain high marks in the written papers is beginning to be fully understood. It was obvious to examiners by the quality of candidate responses which centres had done this and they should be congratulated. By contrast examiners reported that there were several questions where candidates appeared to be basing their responses on general knowledge and responses were superficial.

The communication skills shown by the candidates, was an improvement on previous papers and a lot of good graphics was seen at both tiers. Many scripts made good use of colour which made them visually interesting and clear to mark. The expectation that candidates will bring coloured pencils into the examination is understood by the majority of centres although it is still surprising to report how many candidates, particularly at the Foundation Tier did not use colour and so prevented themselves from accessing a considerable number of marks.

There is still a lack of technical vocabulary being used by candidates and far too many generic terms are used in the answers. Generic material groups such as “wood” and “plastic”, for example, gain no credit

Paper/card is the compulsory material and as such there are always likely to be questions relating to the properties, the sources and the manufacturing issues associated with these materials. This appears to be fully understood by the majority of centres and this was reflected in candidate responses at both tiers. Candidates who studied more than the minimum of paper/card plus one other material were advantaged by having more choices and it was apparent where centres had encouraged a multi-material course.

Candidates are expected to be able to deal with issues such as labelling, packaging and instructions (including symbols) as well as having a basic understanding of nets for constructing in paper/card. They should also be able to name the main printing methods, lithography, flexography, screen printing etc and should be particularly aware of die-cutting as a major manufacturing technique associated with paper/card products. Whilst this was an area of considerable improvement at the Higher Tier it was a major omission on many Foundation Tier scripts.

Manufacturing in quantity in school technology rooms was established in 2005 and this type of question was replicated in 2006. The similar question this year was, again, a major differentiator and potentially offered the highest marks in the papers. It is essential that candidates are confident about manufacturing simple shapes in quantity using school facilities. Many candidates, however, failed to access the full marks through lack of technical detail. It is essential that CAM and/or manufacturing aids are mentioned and that the quality assurance issues and safety implications are fully understood. Where coursework has encouraged this approach candidates should be better prepared for this question. The Appendix to the Mark Scheme which aided consistency for markers might be useful to centres in dealing with this type of question in the future.

Product analysis/product evolution is also well established in the papers and candidates should be able to compare products with similar functions but designed for different markets. The Foundation Tier requirement this year to suggest changes to make a product more appealing to a different target market was poorly answered by many candidates with suggestions for colour changes being the most common.

Candidate's knowledge about the impact of named designers/design movements on the products we use is often poorly addressed both in coursework and the written papers. Again this year these questions attracted superficial responses in most cases. Where candidates are encouraged during KS3 and/or Y10 to 'design in the style of....', they might be better equipped to answer such questions. The Foundation Tier question related to natural forms was reasonably well answered by candidates and commercially viable designs from the more able candidates were reported by examiners.

Questions relating to the use of ICT in manufacturing industry have continued to appear in the papers and once again this year responses were generally lacking in technical detail. Whilst "Computer Numerical Control" on the Higher Tier could be named, few candidates could provide detailed responses as to the application of CNC. At Foundation Tier few candidates could provide a detailed response to how CAD could aid design development.

Issues related to commercial manufacturing are a general expectation and the Higher Tier question this year produced some of the weakest responses within the paper. Terms such as Batch Production, Just in Time etc were poorly understood and even the principle of assembly line production was not widely understood by many candidates.

Environmental issues continue to appear in the papers and the Higher Tier question this year attracted some superficial responses in a lot of cases. Human Factors were dealt with as Anthropometrical data in the Higher Tier and access in the Foundation Tier. Whilst many candidates did score well on these sections many more provided very weak responses. The social issues addressed in the Foundation Tier appear to have been misinterpreted by many candidates and some inappropriate responses were reported by examiners.

The examination paper is settling into a common format and centres and candidates seemed to have prepared well for the examination using previous papers. The paper was accessible to most candidates. There were very few question left unanswered and most candidates made some attempt to complete the paper. Communication skills have improved, year on year and the expectation that drawing tasks will be undertaken in the written paper has led to candidates being better prepared for this.

Question 1

The materials question proved a relatively easy start to the paper again this year and it is pleasing to report how well the candidates responded to this, many gaining maximum marks.

- (a) This was generally well answered
- (b) (i) A small number of candidates listed generic material groups rather than specific materials and therefore failed to gain a mark, i.e. wood, plastic, metal.
 - (ii) Large numbers of candidates selected a wood based product and scored well with waxing and polishing being popular answers.
 - (iii) Most candidates were able to identify stock forms and Paper/Card was a popular response. Timber and food were also popular areas with most candidates scoring the two marks.

Question 2

This question was less well answered and many candidates failed to gain full marks despite the topic being well covered recently in television advertising campaigns. Few candidates were able to answer in any depth.

- (a) Candidates were generally confused and frequently listed recycling as a disposal method. This was allowed, enabling some marks to be awarded, but few candidates gained full marks.
- (b) (i) This was generally well answered and plastic carrier bags and car parts were popular responses.
 - (ii) Most candidates gained two marks with general responses regarding saving energy and natural resources. Few provided a really full answer to gain maximum marks with issues such as pollution, or even costs to the consumer.
- (c) Many candidates failed to identify as asked a specific product as requested and therefore did not collect full marks. Most candidates were able to describe satisfactorily a limited life span and food examples were popular responses.

Question 3

This question was generally well answered with high scoring responses being common. The quality of communication was extremely impressive in many cases.

- (a) (i) & (ii) Both sections were generally well answered and candidates gained most of the marks available. Responses often related to environmental issues and ergonomics.
- (b) Some very good detailed sketches were produced showing clear arrow head direction enabling stages 1 and 3 to be well answered. Most candidates in stage 2 however showed the electric toothbrush either in water or under a tap, so they failed to gain 2 marks.

- (c) Packaging was generally feasible and well detailed sketches provided by many candidates. More than one view was often shown with good annotation. The “Euro Slot” was frequently shown as a means of hanging the package. The company logo and instructions were mostly identified. Most candidates identified clear see through plastic but failed to name the material used. Vacuum forming or blister packaging was identified and often clarified in section (d).
- (d) Candidates mentioned glue as a means of sealing the package and security tape was a common response. Some candidates interpreted the problem as individually sealing the heads in separate plastic bags and this was rewarded. Occasionally, this aspect of the question was not attempted. Fewer candidates were able to identify the industrial printing methods used. Credit was given for any named industrial method although lithography was the expected answer. The majority of candidates were aware of die cutting as a means of cutting out the package. The sectional drawing of the die cutter was often seen and responses were generally much better than previous years.

Question 4

This question was generally well answered although few candidates gained the full marks.

- (a) Sections (i), (ii), (iii) and (iv) were all well answered and frequently achieved high marks.
- (b) Most candidates understood the term anthropometric data but frequently candidates failed to associate it with the design and comfort of the shoe. Better responses included matching production numbers to the data and references were made to the 5th to 95th percentile. Few candidates scored 3 marks.
- (c) The majority identified cheap labour as the advantage and transportation as the disadvantage of setting manufacturing in other countries. References to the source of raw materials and wider markets were seen as additional advantages in a few cases. Problems with communication and monitoring quality were also mentioned as disadvantages.

Question 5

This type of question is now well established and responses improve year on year. As the largest scoring question it was pleasing to see how well this topic had been taught in many centres.

- (a) Simple accurate sketches scored well. Christmas trees and parcels were popular choices.
- (b) Generally well answered although some candidates are still giving generic terms instead of specific named materials. “Plastics” was commonly seen. Reasons given were generally sound and included ease of production, costs, availability etc. Finishing methods were varied. Credit was given to candidates who mentioned that laser cutting acrylic requires no additional finishing. Credit was also given to decorative effects mentioned such as vinyl cutting.

- (c) This section of the question was a major differentiator with many candidates giving the barest details whilst others describing all stages of production. The majority of candidates described methods using resistant materials with CAD/CAM and die-cutting being popular options for consistency. Some candidates misinterpreted the question and described how the packaging would be made. Full credit was given as long as each section was addressed.

Most answers were well written and appropriate to the chosen material and process but many stopped half way through manufacture. Most drawings and notes were superficial and assumed that the markers fully understood the process. References to machine tool paths, nesting and finishing were seen in the better responses. The tools used were usually named accurately and most candidates managed to gain full marks for this aspect. Most candidates could say how they would use QC in their production at some stage but few gained full marks by carrying it throughout the whole production process.

- (d) The methods suggested of attaching the decoration to a tree were generally unimaginative, few gained full marks. Better responses included wire hooks.
- (e) Few candidates gained full marks for this section. Vague answers were given on QA and QC. Simple visual checks were the most common response seen.
- (f) Few candidates gained full marks, often not relating their responses to the chosen method of production. Answers which related to protective clothing and general safety rules were the most popular.

Question 6

This question was a little different from previous years and it was apparent that this topic area has not been well covered in many centres.

- (a) The iPod, mobile phone and the computer were popular choices and many candidates scored maximum marks for this section.
- (b) This was very poorly answered. Most candidates described elements of the products shown. References to rounded forms were common. Few candidates made the link between styles of the past with modern technology. Most responses were pure guesswork.
- (c) Few candidates could explain the qualities of a classic design despite there being many examples illustrated at the start of the question. Some vague descriptions of design movements were seen, Art Deco being a popular choice. Alessi, Memphis or Phillippe Stark were also mentioned but this was in the minority. Few candidates scored more than one mark for this section.

Question 7

Generally not a well answered question with few candidates gaining full marks. This was a good differentiator.

- (a) (i) Around half the answers seen simply described what they saw in the diagram, commenting on the position of the work stations and not how products were assembled on an assembly line.
 - (ii) Most answers mentioned boredom and repetition. Many discussed the lack of communication or the fact that the workstations were too far apart and therefore made communication between workers difficult.
- (b) Many answers concerned the assembling of a pizza, a clock or a cushion. Almost all answers contained poor sketches or diagrams and this might reflect the position within the paper and the lack of time. Many candidates had confused making with assembling and lost valuable marks.
- (c) Manufacturing Terms - most popular answers were Just in time, Batch and Continuous production. Superficial explanations were given; batch - a certain number were produced. Continuous - something produced non-stop. Few gained full marks.
- (d) Over half of the answers correctly describe Computer Numerical Control but most candidates failed to provide an adequate explanation. There were few good answers and many gained no marks.

Mark Ranges and Award of Grades

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<http://www.aqa.org.uk/over/stat.html>