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General Certificate of Secondary Education

Design and Technology: Product Design

3544F Written Paper

Report on the Examination

2008 examination – June series

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General

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.

Again, candidates appeared to find the papers accessible although some centres may have prepared their candidates 'too well' for some questions resulting in some very superficial responses which failed to attract the higher marks. This occurred where candidates appeared to have learnt their response to 'that question' and did not fully read the rubric to respond to changes to the established format.

There were few misunderstandings of terminology and the language and format of the rubric is now well established to enable most candidates to fully access the papers.

It might be significant to report that AQA have again provided high levels of support to centres this year in the form of one-day workshops and around 200 centres have attended these. It was obvious to examiners by the quality of candidate responses that many centres are now teaching the full subject content to enable their candidates to access the full range of marks and those centres should be congratulated.

In general, communication was very good for both tiers. Most candidates now appear to have the correct equipment and there was an increased use of colour this year, making scripts visually interesting and clearer to mark.

There was an increased use of technical vocabulary by candidates and fewer generic terms used in the answers. Some candidates still use generic material groups such as "wood" and "plastic", for example, which gain no credit. Centres do however appear to have better prepared candidates to answer this type of question.

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 labeling, 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, again this was an area of considerable improvement at the Higher Tier this year, it was again a major omission on many Foundation Tier scripts.

There was an increased requirement for candidates to describe manufacturing processes this year on both papers and candidates responded very well. Candidates were able to draw on their experiences in the school workshop and to describe manufacturing processes in detail including references to quality control and health & safety. Where candidates were required to select a product from a list to talk about, nearly all selected a product appropriate to their studies, a significant improvement on previous years, and were able to access the full range of marks.

Manufacturing in quantity in school technology rooms is now well as a feature of the Product Design papers. Candidates appeared confident in selecting an appropriate product from their experience of manufacturing in the school workshop and only a small number of candidates selected products for which they were unable to describe the manufacturing process. Many students did however misread the rubric and lost valuable marks by not completing a sufficiently detailed design solution prior to describing its manufacture. Levels of technical detail were much improved which enabled more candidates to access the full range of marks. Many candidates on both tiers were able to include references to CAD CAM, particularly laser cutters although some were still unsure about the actual CAD CAM process after designing and before realization which suggests that some centres are still not allowing students access to this equipment in favour of the technician or teacher.

Where coursework has encouraged manufacturing in quantity and / or the use of CAD CAM 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 is also well established in the papers and candidates should be able to compare products with similar functions but designed for different markets. This question was very well answered this year and candidates were able to identify appropriate design features and give their benefits to the user. Centres should be congratulated as this implies that Product Analysis is now embedded in teaching of the specification.

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. At Foundation Tier most candidates could again identify CAD CAM and other coursework based skills such as presentation and report writing but no wider knowledge in terms of commercial designing.

Retro design featured on both the Foundation and Higher papers this year and initiated a very good response from most candidates. Answers were detailed and included good examples of other products from their own experience.

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. There were less superficial responses and most candidates showed a level of knowledge and understanding of materials, processes, design issues and technical vocabulary.

Question 1

A very successful start to the Foundation paper and many candidates achieved high or full marks on this question.

(a) Well answered with candidates giving appropriate responses about how the products could be recycled or reused and showing awareness of the Rs. A minority of candidates gave simplistic responses such as bottle bank or recycling with no explanation of the next stage and which was not rewarded.

(b) The majority of candidates gave good reasons for recycling products such as energy saving and preserving resources. Where these statements had been explained fully candidates were awarded full marks

(c) (i) Many candidates were able to successfully identify the composition of the drinks carton and the best responses described a foil lined carton with a plastic lid that was difficult to separate. A number of candidates talked about the card becoming soggy or the use of colour which was incorrect.

(ii) There were many successful alternative packages mentioned. Popular choices were plastic or glass bottles that were made from one material and so could be easily recycled. A few candidates described an environmentally friendly package for a product other than the drink such as cardboard boxes. Full credit was given for environmentally friendly material with an appropriate explanation.

Question 2

The first part of the 'materials question' proved very accessible. Many candidates found the second half more challenging and therefore few candidates achieved maximum marks for this question.

(a) Generally very well answered with most candidates achieving maximum marks. Copper rather than copper ore was often incorrectly stated as a source. A very small number of candidates misread the question and gave appropriate products for each of the materials but gained no marks.

(b) Again, well answered by most although a significant number of candidates appeared to confuse renewable/non renewable with recyclable and therefore answered incorrectly. Many candidates thought cheese was renewable.
Many candidates ticked more than the required two responses which improved their chances of gaining maximum marks.

(c) Many candidates found this question challenging.
Some candidates repeated the example given but changed the product or the explanation very slightly. This would not receive credit.
Many candidates gave a material instead of a product but then went on to successfully describe how materials had been combined to improve properties / function.
Most popular answers were laminate flooring, alloy wheels or food packaging.

(d) (i) Very few candidates were able to name a product and appropriate component. Some candidates gave a product and a material or vice versa.

(ii) Many candidates answered with the functions of components e.g. holds the product together, adds decoration etc. Some candidates misunderstood the word 'component' and some answered as if for 'composite'.
Good although infrequent responses included advantages when manufacturing in quantity in terms of time, cost, quality, remote manufacture etc

Question 3

A very successful question, high scoring overall. This question has become embedded in the style of the paper and it was clear that most candidates were well practiced in answering the 'packaging' question. Centres should, however, take care to ensure candidates do not learn how to answer questions as if by 'rote' as some candidates appeared to be miss the opportunity to gain marks by giving their learnt answer and not reading the rubric sufficiently to notice changes in focus.

(a) (i) Most candidates were able to show a knowledge and understanding of ergonomics and user interface with the product. Good responses included reference to grip and fit for comfort and safety. A small minority referred to anthropometrics and average sizes. Most candidates were able to achieve 2 marks

(ii) Again very well answered by most candidates. Acceptable answers included signal for danger, aesthetically pleasing and easily seen to avoid accidents. Candidates frequently achieved full marks

(b) Although very well answered by most candidates, many candidates repeated answers from part (a). To gain full marks, candidates needed to describe the feature rather than indicating A, B or C for one mark and then go on to describe how it was an improvement on the knife shown in figure 2 for a further two marks.
A significant number of candidates talked about the knife shown in figure 2 being an improvement on the knife shown in figure 1 but were not penalised and appropriate responses were still able to receive full credit.

(c) This was well answered by most candidates.

- Most candidates drew the 'euro slot' or other commercially recognised hanger and few candidates scored less than full marks.
- Most candidates appropriately cited the company name and / logo.
- Most candidates indicated appropriate placement for the instructions.
- Few candidates scored marks as some misunderstood the wording to mean how the knife rather than the packaging would be assembled and others appeared to be answering for previous years and gave information about the plastic blister part of the packaging. Some candidates did however respond very well with detailed sketches showing nets / exploded diagrams / annotation of heat sealed / adhesive coatings etc.
- Most candidates are now able to show their knowledge and understanding of product packaging, responses were very well drawn and annotated and most candidates scored two or three marks for quality of communication. A small number of candidates drew their response in the space on page 8 under the rubric rather than taking full advantage of the illustration and space on page 9. Some candidates took full advantage of the space available on both pages to provide very detailed responses

(d) Although many more candidates than previous years were able to write 'die cutting' for two marks, 'stamping' for one mark, many did not score any marks as they described 'one-off' or school based processes which would not be appropriate for commercial manufacture

(e) Again, although many more candidates than previous years were able to write 'lithography' for two marks, 'flexography', screen printing or 'gravure' for one mark, many did not score any marks as they described 'one-off' or school based processes which would not be appropriate for commercial manufacture

(f) Barcode - very well answered, most students achieved one mark.
Plastic recycling symbol – most candidates failed to achieve the mark as two pieces of information were required. Most identified that it was a recycling symbol or that it denoted a plastic material but few were able to write both for a full response. A common answer was 'can only be recycled once.'

Question 4

Many candidates gained high marks for this question and in general it was very well answered. Candidates seem very well practiced in product comparison and are able to identify target markets for products year on year.

(a) All four lights were equally selected for comparison although the most successful responses were for the cycle light; possibly as students could talk form their own experience. To achieve three marks, candidates were required to identify a typical user and describe how specific design features met that user's needs. Most candidates were able to achieve full marks.

(b) The Energy Saving Lamp was most frequently selected and gave the most successful responses. A small number of candidates misunderstood the rubric and talked about the Tungsten Filament Lamp in their response which was rewarded appropriately but responses did not score well. Some candidates misread the scale of the lamps or confused the features of each but in general an extremely successful question.

Question 5

Candidates responded well to this question and were able to draw from their experience of manufacturing in the school workshop to provide appropriate and detailed responses. Most popular were letters D, S, I and G with E being least popular perhaps due to issues of clarity in the illustration. Where candidates had first hand experience of the process they were more successful and responses were centre dominated.
For D, the process for making and decorating a chocolate cake was successfully described in detail by most candidates and was easily accessible for those candidates studying Product Design through the medium of food.
S was most often described as metal forging although some candidates successfully described the pewter casting process.
I was most often manufactured using a wood turning lathe although some candidates used vacuum forming and HIPs.
G was most often manufactured using vacuum forming, although some candidates used CNC to cut the letter and then glass paper to achieve the rounded edges.
N was in general poorly answered and many students superficially described textiles processes, very often getting the order wrong.
E was most often identified as a paper and card product rather than a circuit board although responses were appropriately rewarded for correct processes.
Communication was in general good although some candidates did nor score highly as they did not include diagrams where appropriate or processes were not sequential or in the correct order. Many candidates used flow charts. Candidates studying Product Design through the medium of food were able to score full marks without diagrams if they had provided a comprehensive ingredients list and laid out their method sequentially.

Question 6

Many candidates gained high marks for this question and were able to answer from their own experience which showed an increased knowledge and understanding of manufacturing in quantity in the school workshop

(a) Many candidates responded very well and produced detailed and well annotated designs. Most popular was the bookmark although candidates chose the full range of products with varying levels of success. Some candidates chose products for which they were not then able to describe the manufacturing process in part 6 (c) despite the clear instruction in the rubric. Some candidates clearly did not have coloured pencils to enable them to score marks for the addition of colour and tone although candidates who produced monochrome designs were not penalised. Some candidates produced a manufacturing response for part (a) which they then repeated for part (c) without drawing a detailed design solution. Others realised their mistake and drew their solution in part 6 (c). Examiners positively rewarded accordingly.

(b) (i) Most candidates were able to identify a specific and appropriate material. Generic responses such as wood and plastic or indeed thermosetting plastic were not rewarded as in pervious years.
Some candidates identified a material in part (b) (i) which they did not then use in the manufacturing process in part (c). Candidates were not rewarded with the mark for part (b) (i) where this was the case to enable them to gain maximum marks for part (c).

(ii) Most candidates gave a sound explanation either linked to the suitability of the material, design or anticipated manufacturing process. Superficial or inappropriate responses included reference to suitability for the user or aesthetics.

(c) There was generally a lack of understanding of batch production and many processes described were not suited to the manufacture of 50 products e.g. bookmarks cut out with scissors. The most successful responses focused on the use of CAD and CAM and laser cutting was a popular response.
Some candidates were able to appropriately describe how they would ensure all of their gifts were identical although others received marks for an implied response as a result of the process selected i.e. CAD CAM / 2D design / laser cutter / tessellation / copy and paste etc.
Many students gained two marks for correctly identifying an appropriate range of tools and equipment although where there were gaps or the significant inclusion of inappropriate equipment, students scored one mark.
Some gained full marks for communication for detailed answered accompanied by good, clear diagrams illustrating the process and naming the tools and equipment. Poorer answers had no supporting diagrams, superficial notes and lots of omissions in the given process.

(d) (i) Good responses with risks identified that were generally relevant to the process.

(ii) Marks were awarded for relevant personal protective clothing or housekeeping rules and many good answers were seen.

Question 7

Overall, a very well answered questions with candidates showing their wider knowledge of Product Design.

(a) Well answered by some although few used tonal rendering skilfully to give a 3D effect. Where the question was attempted the majority of candidates scored two marks.

(b) There were some good answers which gave examples of the use of CAD and CAM, report writing, presentation and research skills. A few candidates quoted advantages of ICT e.g. saving and editing of work which was not relevant to the question set.

(c) Most candidates knew the terms, but many struggled to explain them in sufficient detail to gain full marks

(d) (i) Well answered with many candidates knowing the term 'retro' design.

(ii) Very well answered with many candidates scoring three marks.

(iii) Well answered with candidates giving clear advantages of the use of plastics in the radio. Lightweight, cost savings and production issues were identified by many.

Question 8

Again candidates responded successfully to this question with many candidates scoring highly.

(a) Well answered by the majority who identified three relevant measurements.

(b) Any logical same positioning of the knobs was accepted for two marks, and these answers were in the majority.

(c) (i) Well answered by most with some very good levers and grips seen. There were also a lot of remote sensors. Where these modifications to the tap had been well sketched and described full marks were awarded.

(ii) Generally well explained with many candidates scoring full marks.

Mark Ranges and Award of Grades

Grade boundaries and cumulative percentage grades are available on the Results Statistics page of the AQA Website.