
General Certificate of Education Design and Technology: Product Design 3D

PROD3

Report on the Examination

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General Comments:

There were very few rubric infringements seen this year, with candidates recognising the need to answer multiple items per question. Candidates continue to avoid using diagrams to support their answers and rely heavily on written explanations. When a candidate used sketches they tended to access the higher mark bands within questions. Lower level responses were identified with the use of generic statements often not supported or explained, higher level responses showed a depth of understanding and application of knowledge including technical detail clearly stated.

Question 1

- 01 The question refers to casting techniques and uses photographs of two dissimilar products to encourage candidates to discuss the relative benefits of die-casting and sand casting. It was anticipated that candidates would describe each process and then refer to the different characteristics of the products to enable them to justify the decision to use the specific process chosen. In reality the question was unpopular with many candidates confusing the two processes. When candidates performed well they were able to explain that sand casting is good for large products made in small batches, due to the low cost moulding material, but due to the labour cost involved high pressure die casting is better suited to large scale production of small size products.
- 02 This item was aimed to link the casting methods referenced in the specification with rapid prototyping. When candidates performed well they referred to investment or lost-wax casting and the production of complex 3D wax forms from a 3D printer, which could then be replicated using the casting process. Many candidates failed to link the two strands, talking either about casting jewellery without reference to modern prototyping, or referring to the production of 3D printed resin jewellery with no reference to casting techniques.

Question 2

- 03 The question refers to a detailed manufacture plan of the candidate's coursework project and was a fairly popular item. Candidates performed well when they avoided retrospective diaries and included diagrams detailing the product they were describing. Other areas displayed in better responses were specific QA and QC checks, such as reference to using depth stops on pillar drills or jigs etc. Where the word jig was used but no specific detail was given then candidates could not receive further credit for future references.
- 04 The question asked candidates to explain two different measuring techniques used in a specific industrial context. To gain top marks candidates were expected to refer to specific techniques and possibly use diagrams to aid their explanations. When candidates used examples such as rulers and tape measures they restricted their possible marks. Some candidates referred to the use of a go/no go gauge explaining its suitability for use in large-scale production. This was then compared to the use of a micrometer and its suitability for a situation where many different objects are to be measured accurately as it can be adjusted, but relies on the accuracy of sight.

Question 3

- 05 This question was very popular with the majority of candidates accurately identifying the manufacturing process for both packages. Often the material specified for the cereal box was only given as 'cardboard' thus slightly restricting the mark available. The question asks for the suitability of the manufacturing process and material for each of the packages and not specifically for details of the manufacturing process, meaning that a candidate who detailed the

vacuum forming process with no reference to why it was suitable or the material properties of PET was restricted in the marks they achieved.

- 06 This question was very popular, largely down to item 05. However, students who recognised the environmental issues associated with EPS and referred to specific packaging materials and how they are used to replace EPS were able to access the full mark range. Where candidates referred to materials such as ‘cardboard’ or ‘thermoplastics’ but failed to explain how they were formed to replace EPS marks were restricted.

Question 4

- 07 The question was referring mainly to anthropometric data and when candidates performed well they identified the percentile range used by a designer in the design of an office chair. Reference to specific anthropometric measurements and adjustability of the back angle and seat height were necessary for higher marks with high level responses referring to the range of movement on these adjustments and use of elastic materials within the seat to adjust to a wide range of body shapes.
- 08 This question was very accessible with candidates recognising the product and the context. Higher-level responses referred to the form of the chair combined with the suitability of the polymer for the seat section. Candidates often referred to functional characteristics such as stacking and the connected legs to increase the rigidity of the form.

Question 5

- 09 The question refers to positive and negative effects of the mobile phone on society. This was a very popular question and on the whole candidates answered it well. Higher-level responses were identifiable by their coverage of both positive and negative effects, considering the wider impact of the mobile phone on society such as antisocial issues and changes in language due to the introduction of texting.
- 10 The question refers to designing a mobile phone for the elderly. For candidates to access the higher mark bands it was expected that the points made would be explained and technical language would be used to explain the modifications in detail, this could be: ‘the inclusion of a TPE over-moulding on the edges of the product would increase the grip’. The inclusion of diagrams to support the points made was key in the higher mark band. Many lower level responses referred repetitively to increasing the size of elements on the product, without any justification.

Question 6

- 11 This was a popular question with candidates able to identify a wide range of safety features from the photographs. Higher-level responses covered issues including material choice, product form and use of colour. The majority of candidates accurately identified the material used for the plug casing.
- 12 Responses to this item were varied with lower level responses referring to recycling of components with very limited detail. Higher-level responses referred to use of temporary fixings to aid disassembly and in some cases the use of active disassembly by including SMAs. Legislation was often mentioned and related directly to the product in question with reference made to the WEEE (Waste Electrical and Electronic Equipment) directive and RoHS (Restriction of Hazardous Substances) directive along with the ELV (End-of-Life Vehicles) regulations for motor vehicles.

Mark Ranges and Award of Grades

Grade boundaries and cumulative percentage grades are available on the [Results Statistics](#) page of the AQA Website.

Converting Marks into UMS marks

Convert raw marks into Uniform Mark Scale (UMS) marks by using the link below.

UMS conversion calculator www.aqa.org.uk/umsconversion