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Examiners' Report
Principal Examiner Feedback

Summer 2023

Pearson Edexcel GCE
In Design & Technology: Product Design
9DT0/01

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Principal Examiner's Report 9DT01 Summer 2023

This is the third full summer series sitting of the examination, with only small resit entries in the 2020 and 2021 October series during the pandemic . This was a new A Level in Design and Technology (Product Design) in 2019 and has an externally assessed exam reflecting 50% of the qualification assessment.

The overall paper includes several types of questions which include; short, medium and long open response questions, calculations and drawings. This provides increased rigour over the legacy specification examinations as candidates need a wider skill set in order to access the different types of question.

There is a 3 mark explain type question which requires a candidate to give a fact (sometimes knowledge in isolation and sometimes related to a specific context and follow it up with a justification which leads to further conclusion or a further consequence. This type of question provides additional rigour.

The long response essay questions together with the drawing question are assessed by use of a levels-based mark scheme. This type of mark scheme rewards more able candidates who can now go into greater depth and be awarded for knowledge and deep understanding.

The feedback on individual questions will follow together with commentaries on individual responses.

Feedback on Individual Questions

Question 1(a) (2 marks short open response)
This question required candidates to name two knock-down (KD) fittings that could be used for the assembly of a flat-pack wardrobe. This was essentially an introductory question requiring recall. However, candidates did not perform well on this question with very few demonstrating knowledge of KD fittings. Most candidates responded with fittings and fixings that are in general use rather than specific KD fittings.

Question 1(b) (4 marks short open response)
This question required candidates to explain two characteristics of veneered chipboard that make it suitable for use for flat pack wardrobes. This question performed as expected with an appropriate spread of marks to differentiate between candidates of differing abilities. A range of responses detailed in the mark scheme were provided by candidates. The most common mistake was to state that chipboard is lightweight and therefore easy to carry, transport or assemble.

Question 1(c) (3 marks short open response)
This question required candidates to explain one disadvantage of using veneered chipboard for the wardrobe. The question performed relatively evenly across the three-mark range although 31% of candidates failed to score on this question. Candidate responses generally covered a range of responses from the mark scheme with 'veneer easily scratched or

damaged, resulting in the chipboard core becoming visible which impacts on the aesthetics of the product' being the most common response.

Question 2(a) (2 marks short open response)
This question required candidates to state two types of board that would be suitable for making the packing case. The question elicited a range of responses from candidates with the majority of candidates achieving one or two marks. The most common mistake was just to state 'cardboard' which is too generic and a specific appropriate type needed to be given in order to be awarded marks.

Question 2(b) (5 marks maths)
This was a calculation question relating to ink usage and the number of extra packing cases that could be printed after the original order had been fulfilled. Candidates performed very well on this question with 55% of candidates achieving the full five marks and only 6% of candidates failing to score.

Question 3(a) (2 marks short open response)
This question showed an image of a vacuum formed organiser. Candidates were required to explain a feature of the mould that improves productivity and quality. As this is a familiar process used in schools' design technology workshops candidates were familiar with the required features of a vacuum forming mould, however some candidates still used 'there should be no undercuts that would lock the plastic in place', this is an excluded answer as it is a repeat of the example given in the question stem.

Question 3(b) (4 marks sketches and annotations)
This question required candidates to describe the vacuum forming process using annotated sketches. Candidates, due to the familiarity of the process, did very well on this question with 58% of candidates achieving the full four marks. The relatively small proportion of candidates (9%) who did not achieve any marks for this question typically described the wrong process, most commonly describing the blow moulding process.

Question 3(c) (6 marks short open response)
This question required candidates to explain two disadvantages of the vacuum forming process. The question proved to be a good discriminator between candidates of differing abilities with marks awarded following a normal distribution curve across the six-mark range. More able candidates were able to identify two disadvantages and provide two appropriately linked points for each explanation. Once again it was clear that candidates were able to draw upon familiarity and their own experience of using the process.

Question 4(a) (3 marks short open response)
This question requires candidates to give the here roles within the scrum team. This is a relatively new topic within the design technology curriculum both for teachers and candidates. Whilst being a recall question the vast majority of candidates found this very challenging. Most candidates responded with generic roles within any design and development team rather than roles that are specific to, or focused on, scrum.

Question 4(b) (6 marks extended open response)
This question continued with the scrum theme and required candidates to outline the features of the scrum process. Once again candidates found this to be a challenging question. Many candidates just described the design process whilst others described the production process. Only 15% of candidates achieved marks of 4 and above and it was clear that candidates' experience of scrum within the curriculum was mostly limited.

Question 4(c) (2 marks short open response)
This question required candidates to give two methods of protecting the form and function of a product to prevent other manufacturers making exact copies of the product. The majority of candidates 89% scored at least one mark on this question with patents being the most common correct answer.

Question 4(d) (9 marks extended open response)
This question required candidates to discuss how the design and manufacture of consumer products can minimise the impact of the products on the natural environment. The question performed well with outcomes across the mark range following a normal distribution curve. Candidates demonstrated good knowledge of sustainable techniques, cradle to cradle approaches and use of the circular economy.

Question 5(a) (6 marks maths)
This question was a maths question requiring candidates to the sector angle of a pie chart to represent the sales of three different types of cars. Candidates performed well on this question with 60% of candidates achieving five or six marks. Where candidates dropped a mark, this was usually because of incorrect or inappropriate rounding, however 46% of candidates achieved the full six marks. The vast majority of candidates 89% scored marks on this question with only a limited number of candidates scoring only one mark for calculating the total frequency. Some candidates correctly worked out the sales proportions but did not then make the final step of converting to a sector angle.

Question 5(b) (2 marks maths)
This question required candidates to calculate the mean price of car sales. This question proved to be a good discriminator of mathematical ability. Overall, 36% of candidates achieved the full two marks for calculating the mean sales price of the 405 car sales. However, a large proportion of candidates did not calculate the mean price of car sales but simply calculated the mean of the three car prices, in this instance a mark of one was awarded for demonstrating the ability to calculate a simple mean. Overall, 91% of candidates were awarded marks on this question.

Question 6(a) (2 marks short open response)
This question required candidates to give two benefits of using varnish on the deck of a teak decked speedboat. This proved to be a very accessible question with 99% of candidates achieving one mark or more and 77% of candidates achieving two marks. The most common mistake was candidates stating that varnish would provide an anti-slip finish.

Question 6(b) (6 marks short open response)
This question required candidates to explain two benefits of the speedboat hull being manufactured from GRP. The question performed well with outcomes across the mark range following a normal distribution pattern. candidates were mostly able to correctly identify the lightness, watertightness, and durability of GRP but only the most able candidates were able to provide two appropriately linked explanations for each correct benefit.

Question 6(c) (6 marks extended open response)
This question required candidates to discuss the characteristics and applications of quality assurance and quality control applied to the manufacture of the speedboat. The outcomes followed a normal distribution curve, skewed towards the bottom of the mark range, centred on a modal mark of two. Candidates generally demonstrated better knowledge of QC than QA but generally struggled to apply their knowledge to a one-off production scenario for the speedboat.

Question 6(d) (2 marks short open response)
This question was a recall question requiring candidates to name two pieces of health and safety legislation. Candidates generally had some difficulties with this question and 57% of candidates failed to score. The most common correct answers were: The Health and Safety at Work Act (1974) and The Control of Substances Hazardous to Health (COSHH) Regulations. The most common mistake that candidates made was to give examples of control measures rather than naming the legislation.

Question 6(e) (3 marks maths)
This question required candidates to calculate the amount of fuel needed for the speedboat to travel 25km. The question was generally well answered with over 50% of candidates achieving the full three marks.

Question 7 (6 marks drawing)
This question required candidates to produce a 3rd angle orthographic projection of a component shown in the question as an isometric projection. Candidates generally performed very well on this question with approaching 60% of candidates achieving marks in the top mark band. Some candidates lost marks because then did not add dimensions or inappropriately dimensioned their drawings by imprecise dimension lines and missing limit lines. Only a relatively small proportion of candidates appeared to struggle with the concept of 3rd angle projection.

Question 8 (9 marks extended open response)
Candidates were provided with an image of a pencil sharpener designed by Raymond Loewy. The question required candidates to discuss the style and design philosophy of the streamlining movement and how it may have influenced the design of the pencil sharpener. The question performed well with outcomes across the mark range following a normal distribution curve centred around a modal mark of five. Candidates responding to this question were able to draw the conclusion of the tear drop shape, flowing lines and aerodynamics relating to the streamline movement with higher achieving candidates relating to the influence of modern materials, space travel and the atomic age with some

also discussing the associated Googie architectural style. A number of candidates made incorrect reference to dates surrounding the movement and struggled to get Form over Function in the right order. Some lower level outcomes merely repeatedly referred to the teardrop shape.

Question 9 (9 marks extended open response)
This question required candidates to discuss the benefits to the manufacturer of quick response manufacturing (QRM). The question performed well, for this stage of the paper, with outcomes across the mark range following a normal distribution curve centred around a modal mark of three. The responses seen for this question spanned the entire mark scheme. Many candidates discussed reduced lead times, JIT, reduced storage of materials and completed products and the rapid response to customer orders. Higher achieving candidates went on to consider customer satisfaction, market share and company reputation from manufacturing products quickly to meet specific customer requirements such as colour options or extra features as well as the financial impact of reduced waste and overheads. Only a few candidates could explain all aspects of QRM, its purpose, how it was achieved, and the benefits delivered.

Question 10 (9 marks short open response)
This question required candidates to explain three uses of quantum tunnelling composites in electronic products. Once again this is a relatively new topic within the design technology curriculum both for teachers and candidates and the question proved to be very challenging for candidates, with 49% of candidates failing to score on this question. Candidates, in the main, clearly didn't understand the application of quantum tunnelling composites, and whilst candidates identified some appropriate electronic products, they were unable to expand on their response.

Question 11 (12 marks extended open response)
This question required candidates to evaluate the functionality of a bedside lamp with reference to aesthetics and user requirements within a home setting. The question performed well with outcomes across the mark range following a normal distribution curve around a modal mark of seven. Most responses discussed the modern aesthetic of the lamp and its material choices and touch sensitive functions. Lower achieving candidates often dismissed the lamp as poor, offering negative discussion of the touch sensitivity and look of the lamp, additionally, they often picked fault with having an electrical cable and glass shade that would break easily if knocked. Higher achieving candidates offered a balanced argument over the features of the lamp and considered a broader selection of themes in their discussion.

Summary

Overall, the candidates performed very well with a slight increase in the mean score from 2019. Very few blank responses were seen and most candidates attempted every question.