



A-Level

Design & Technology Product Design

7552/1

Report on the examination

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General Comments

Once again, all questions in paper 1 are compulsory for all students and responses recorded in an integrated question and answer booklet. A number of students made use of additional answer booklets in order to expand upon their answer. Where additional pages are used, or where students are using a word processor, it is important to clearly label their responses as many inaccuracies are still being found with question numbering.

The paper had a total of 120 marks and equated to 30% of the overall qualification.

Low level responses were often found to include generic statements and basic descriptions or observations supported by the stimulus material provided in the questions, whether that be visual stimulus or information drawn from tables.

Students need to be able to successfully identify command words in the question and ensure that they link their response to any provided context. A good strategy for this would be to highlight the key terms or focus of each question, allowing students to refer back to this as they construct their answer.

As in previous series, many students reword the question or information provided at the beginning of their response unnecessarily. Centres should encourage students to proceed straight into their response.

Many students continue to use terms like 'cheap,' 'strong,' 'lightweight,' and 'sustainable,' or phrases such as 'suited to mass production,' without providing justification or linking them to the context of the question. For extended responses, centres should encourage students to elaborate on each point with an explanation or justification, and, where appropriate, relate it directly to the context of the question.

It was noted that there was an increase in students referring to a material being 'non-toxic' and then focusing on the ability to recycle the materials at the end of life. While these points may be entirely valid in some instances, referring to them without a degree of selectivity or when not entirely applicable to the given context, can prevent the student from focusing more specifically on more relevant material properties or considerations.

There was a large amount of typed responses seen this year which can help improve the clarity of a student's response. Linked to this was a noticeable decrease in the quality and clarity of some students handwriting.

It was encouraging to see a significant reduction in the volume of unattempted responses.

Maths specific comments

The performance of students in the maths questions continued to improve and it is testament to this clearly being integral to the teaching of the subject within centres.

Students are continuing to improve the layout and clarity of their working out when answering the maths questions. This is enabling more of them to access method marks for early calculations where the final answer may be inaccurate.

Many students are still choosing the incorrect formula for any question that requires an understanding of trigonometry. Once again students often illustrate confusion in the understanding of diameter and radius values in calculations related to area and circumferences of circles.

Care should be taken when rounding answers. Inaccurate or early rounding can cause subsequent inaccuracies later in the question.

Question 1.0 & 1.1

Q1 - Students were asked to state the specific classification of Nylon.

It was clear that although a familiar material, Nylon is a less well-known thermoplastic. There was much confusion regarding its specific material classification. Many students were perhaps more familiar with the material in a textile's context and as such 'Synthetic fibre' was a widely seen correct response.

Centres should try to ensure that all individual listed in the specification are taught to a comparable level of detail as all may be examined at some level of depth.

Q 1.1 – Students were asked to state two specific properties of Nylon.

This was more successfully accessed than Q1, showing that the material knowledge was being taught. High level students provided clear and specific properties related to Nylon, with reference to its chemical resistance and low coefficient of friction being popular answers.

It was clear that many students provided more generic properties of polymers and in these instances, it was often not clear if the student had specific knowledge and incorrect properties were often seen.

Question 2

Students were asked to use the information in a diagram to calculate the length of a labelled cutter path.

Success in this question relied on the student being able to correctly remember and apply the formula for circumference of a circle. It was clear that there remains a huge amount of confusion between the formulas for area of a circle and for circumference of a circle.

The vast majority of those who correctly calculated the total circumference went on to correctly calculate the length of the cutter path.

Question 3

Students were asked to explain why natural rubber an appropriate material for the manufacture of a hot water bottle was.

A familiar context to most students who clearly understood how the product functioned and its intended purpose.

Low level responses tended to provide simple statements such as ‘flexible’ and ‘tough’ but didn’t go on and explain or link these responses to the context.

High level responses showed a huge amount of detail, linking to the context and also explaining how that specific property impacted the function of the hot water bottle.

The most common error seen, was confusion between whether rubber was a conductor of heat or an insulator of heat. Many students also commented on it being non-toxic, which in this context was not relevant.

Question 4

Students were asked to state two requirements of the Sale of Goods Act (1979).

The sale of goods act is actually fairly limited in the number of requirements that it actually stipulates and as such those who were familiar with the act performed well. The most popular options tended to relate to the product being of appropriate quality and safe, with many students also referring to the repair and replacement of faulty goods.

Where students were not fully familiar with the Act, they tended to take an educated guess at what might be covered. A huge range of incorrect or vague requirements were seen.

Although the Act has now been widely replaced by the Consumer Rights Act, it was relevant when the specification was created. Centres should be aware that areas such as legislation quickly evolve, but if it is listed in the specification, they should be aware that it may be examined in both paper one and paper two where applicable.

Question 5

Students were asked to analyse and evaluate the suitability of using moulded paper pulp for a takeaway cup holder.

Another familiar context with students and it was clear from some of the more well analysed responses that many had first hand experiences of using a similar product.

The most popular responses tended to focus on the sustainability aspect of the material, linked to the short lifespan or single use application. Many were aware of its constituent materials often linking this to its aesthetics and many correctly described how its biodegradability helped minimise the environmental impact.

Another response that showed a detailed understanding of the material and the specific application, was reference to the material quickly breaking down and losing rigidity when damp.

Where students provided extended responses but failed to access the higher mark bands, they tended to refer to the function of the product and efficiency of the design such as its ability to be stacked and ergonomics considerations.

Centres should encourage their students to ensure that they pull out the key command words and focus of the question.

Question 6

Students were asked to calculate a length of material that had three hexagons laid out in a horizontal pattern.

A really well answered question with a large percentage of students accessing full marks. The use of Pythagoras to calculate a missing length within a right-angled triangle is clearly a maths skill that students are familiar with and confident in identifying within the hexagon.

Where students couldn't establish the missing length needed to calculate the width of the hexagon, many picked up a method mark for dividing the height of the hexagon in half. It was not uncommon for students to miscalculate the final mark for the total length of the material by not allowing for the overlapping arrangement of the hexagons.

Question 7

Students were asked to discuss the advantages and disadvantages of using contact adhesive to join a laminate to a large sheet of manufactured board.

A challenging question for many students and it was clear that the specific properties and application of contact adhesive was not widely known.

The most common responses focused around its fast-bonding time with some students providing clear detail about the need for accurate placement and the inability to reposition easily.

It was clear in the higher-level responses that some students may have used the adhesive in a workshop setting as they provided detailed and relevant explanations.

Low level responses often provided general statements about adhesive, and it was clear that many students confused the term laminate with lamination.

Question 8

Students were asked to evaluate the suitability of using polyurethane varnish or wood stain as a surface finish.

An accessible question with the vast majority of students being familiar with both surface finishes and demonstrating a good level of understanding of their use and their working properties.

The most popular points made tended to be the comparison between the protective properties of polyurethane varnish and the aesthetic properties of the wood stain.

Students' answers were often really well illustrated with relevant examples to illustrate the point being made.

Question 9.1 & 9.2

Students were provided two dimensioned 2D drawings and asked to show that the combined surface area of the semi-circle and triangle were 5313 mm^2 .

9.1

This is the first time that this style of question has been asked, as students were provided with the correct answer in the form of the total surface area. They were then required to show the correct method and calculations for both the surface area of the semi-circle and the triangle. The level of maths in this question was the most straight forward in the paper this year and as such, many students accessed full marks for this question.

Where full marks were not accessed, it tended to be due to some students being unaware of the method for calculating the area of both shapes and some students calculated the area of a circle but didn't divide that value in half for the semi-circle.

9.2

Again, an accessible level of maths for most students with most scoring highly.

Where students failed to get the final correct answer, it tended to be as a result of them correctly calculating the percentage of material used but then not subsequently moving forward and establishing the percentage of waste generated.

Question 10

Students were asked to analyse and evaluate the suitability of both the materials and manufacturing processes used for two children's stools.

The style and format of this question is familiar to students and was also the highest tariff question in the paper.

Low level responses tended to focus more on the materials than the manufacturing methods and it was clear that students were aware of more relevant specific properties of the polymer than the timber.

Responses relating to the timber tended to be focused on the aesthetics, with higher level students relating the grain structure and thickness of the material to the lamination process.

Responses relating to the polymer were more detailed and directly linked to the context with toughness, the ability to be pigmented and many students suggested the suitability of the polymer for potential outdoor use.

The manufacturing processes were less well covered by students. There was a lack of understanding with regards to the polymer manufacture, with many students not being able to identify thermoforming as the most appropriate manufacturing process. Lamination was much more well answered and more familiar to students.

For students to access the top mark band in this style of question they must reference all of the materials and processes that are provided in the table of data. Materials and processes do not have to be referred to in equal amount of detail, but where only one process or material are covered, students will limit their attainment. ABS was by far the most well referenced element of the question, and it was clear that very few indeed had any understanding of thermoforming.

Many students made reference to weight and cost that didn't add to the quality of depth of their response.

Question 11

Students were asked to give two reasons why photochromic lenses are used in glasses.

To be successfully awarded the mark, students had to be explicit in their response as to why the photochromic material was used in the lenses.

Although it was clear that photochromic pigment was a familiar smart material to many students, the question was often not answer well, with students instead simply describing the function of a photochromic pigment without linking their answer to the context of the question.

Question 12

Students were asked to calculate the percentage of time saved when machining a component from alternative materials.

This was a well answered maths question where students were provided with the relevant information in the stem of the question rather than having to draw out the information from a diagram or table of data.

Where students didn't access full marks, they often gained marks for the method used to convert the time in minutes into seconds.

Question 13

Students were asked to explain how a product may be designed to ensure inclusivity for a wide range of users.

This was the largest tariff of the extended response questions, but was well answered by many students

It was clear that most students were familiar with the term 'inclusivity' as the depth and variety of examples seen in their responses illustrated.

Low level responses tended to make some general statements about the need to accommodate a range of sizes or features to support accessibility for a specific group of users.

Higher level responses provided many well illustrated and relevant points showing a huge range of breadth. All bullet points on the mark scheme were frequently seen in these higher-level responses.

Students should be encouraged to include a wide range of points in the longer 9-mark questions, as examiners often noted that while responses awarded lower marks had appropriate structure and detail, they typically addressed only one or two relevant points.

Question 14

Students were asked to calculate the length of a bar using the information provided on a dimensioned drawing.

This was the most demanding of the maths questions found on the paper, with trigonometry being more challenging than some of the other maths skills covered.

Where students failed to access full marks, they often achieved marks for the correct methodology used, with many correctly interpreting the dimensioned drawing to establish the horizontal length of the tapered section of the bar.

Question 15

Students were asked to outline factors that a manufacturer may need to consider before choosing a surface finish.

‘Outline’ is a fairly uncommon command word in this paper, but essentially it required students to ‘set out the main characteristics.’

Responses tended to be a little less formal in lay out than other extended response questions, but nevertheless students made a range of relevant considerations.

The most popular considerations referred to the products intended use and the environment in which it may be used and students provided good explanations, often suggesting relevant finishes.

Higher level responses referred to the full indicative content in the mark scheme.

Question 16

Students were asked to explain why manufacturer’s instructions for electronic products are now commonly found online rather than included in the products packaging.

This was a well answered question, with students being able to draw upon their own experiences to help illustrate their responses.

The most popular responses tended to focus on the reduction of environmental impact through a reduction of material used and by manufacturers being able to reduce the size of the packaging.

Higher level students in addition also made reference to the enhanced user experience of being able to search online, increase the size of the font and the manufacturer's ability to host a range of languages and perform ongoing updates to the instructions.

Question 17

Students were asked to state two ways that a UV stabiliser prolongs the life of a polymer.

The question was well answered by many students. The most popular answer related to preventing the polymer fading and reducing the speed of degradation.

Where students failed to access marks, they tended to reword the information in the question or responses were too general.

Question 18

Students were asked to give three reasons why sub-assemblies are used when manufacturing a complex product.

Although a well attempted question, examiners found that many students provided simple statements such as 'cheaper' and 'faster'.

Better responses provided some relevant explanation or justification which helped convey their knowledge of the topic.

The most popular responses referred to the ability of a sub assembly manufacturer to be able to specialise in a particular area or activity, closely followed by reference to quality assurance.

Centres should encourage students to provide more detail in this style of question, as often a one word answer will not be sufficient to access the marks available.

Question 19

Students were asked why flexographic printing is a suitable method for applying a company logo to an LDPE carrier bag.

Printing techniques remains an area that appears to be unfamiliar to many students.

Responses tended to be simple statements referring to the range of colours available and linking the quick drying ink to the scale of manufacture.

Some responses however were extremely detailed, and higher level students in these instances successfully linked each point made back to the LDPE carrier bag context.

Question 20

Students were asked to define the term 'translucency'.

It was clear from the responses that students were familiar with the term and understood that it was an optical property.

Many students struggled to articulate their answer however, and often this lacked clarity.

There was much confusion between, opacity, transparency and translucency.

Question 21

Students were asked to explain how computer systems have assisted designers' ability to develop products collaboratively.

The open ended nature of this question was found to be a challenge to some students, with many of them showing narrow breadth of knowledge and an assumption that computer systems only referred to CAD, and as such many responses focused solely on the benefits of CAD with FEA and CFD also being popular.

Students that accessed the higher level mark bands had successfully extracted the 'working collaboratively' focus from the stem of the question and as such showed greater breadth in their responses and provided some detailed answers.

Question 22

Students were asked to explain why injection moulding is an appropriate manufacturing method for a polymer construction brick.

A well answered question by many students. It was clear that the context was familiar to all students and the well-structured responses suggest that the construction brick may well have been used by centres when teaching the topic of injection moulding.

The most popular responses tended to be related to the accuracy and repeatability that is able to be achieved by injection moulding, but surprisingly few students then went on to explain why that was specifically important for the construction brick.

Many students lost a little focus in the question, and it was common to see responses that focused on the properties of the polymer rather than the manufacturing process.

On this question, and most of the extended response questions in paper 1 and paper 2, students would benefit from highlighting the key information within the stem of the question.

Question 23

Students were asked to explain how the implementation of COSHH regulations can protect workers from exposure to hazardous substances in a manufacturing environment.

Although COSHH is clearly a familiar area of the specification, many students lacked significant breadth and understanding of how broad a range of areas the regulations cover.

Low level responses often focused quickly on the use of PPE and LEV, but many missed an explanation of the COSHH guidance or activity that would have led to that control measure.

Higher level responses focused more on the regulations themselves before then going on to suggest the hazard and control measure.

Question 24

Students were asked to describe the process of manufacturing an aluminium component using sand casting in a school workshop environment.

Students responded well to this familiar style of question although it was of a greater level of demand than previous years paper as perhaps a process that is less frequently undertaken in schools.

Most students understood that it was a redistribution process that involved the heating and cooling of the Aluminium, but there was a lack of specific understanding with a wide range of alternative temperatures and heating methods provided.

Many students may have seen the process on social media being performed to produce an outcome successfully and often described a process that involved the manufacture of a mould and the pouring of the molten metal, but often these processes were not suitable for the school workshop environment focus of the question.

There were however some fantastic responses that described the process in a huge amount of factual detail.

Mark Ranges and Award of Grades

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