



Examiners' Report

June 2022

GCE Design and Technology (Product Design) 9DT0 01

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June 2022

Publications Code 9DT0_01_2206_ER

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Introduction

This examination was the first full sitting of the external examination since 2019. It was a new A Level in Design and Technology (Product Design) in 2019 and has an externally-assessed examination, reflecting 50% of the qualification assessment. Advance Information (AI) was provided to centres for this examination series.

The overall paper contained several types of questions, which included short, medium and long open-response questions, calculations and drawings. This provided increased rigour over the legacy specification examinations because candidates needed a wider skill set in order to access the different types of question.

There was a three-mark 'explain' type question that required a candidate to give a fact (sometimes knowledge in isolation and sometimes related to a specific context) followed by a justification, which lead to a further conclusion or consequence. This type of question provided additional rigour.

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

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

Question 1 (a)

This question required candidates to name two of the metals alloyed with carbon to produce stainless steel.

The expected response was to state the two key ingredients of nickel and chromium; however, this was seen infrequently and candidates suggested other metals that are added to specialist stainless steels, which were nevertheless worthy of credit.

This did, however, result in a potential rise of 'guessed' answers receiving credit.

(a) Stainless steel is an alloy of iron, carbon and other metals.

Name **two** other metals that can be alloyed with iron and carbon to make stainless steel.

(2)

1 Chromium

2 Nickel



ResultsPlus
Examiner Comments

This is the most usual and expected response.

Chromium and nickel are the two key ingredients of stainless steel, other than the elements listed in the question stem.

Total: 2 Marks



ResultsPlus
Examiner Tip

When the command verb is 'name', a very short, often one word, response is appropriate.

Question 1 (b)

This question required candidates to explain two working properties of stainless steel that make it a suitable material for the sink, related to the sink's typical use in a kitchen.

Two key properties – strength and durability – had been excluded by their incorporation into the question stem. Candidates generally performed well, being able to identify key properties. However, they often had the incorrect linking explanation, such as linking toughness to scratch resistance, and hardness to impact resistance.

When the command verb is 'explain', as it is in this question, a linked response is needed. So here, for each part, candidates need to identify, or name, an appropriate property and then give a reason or explanation of why that property is appropriate, within the context of the question.

(b) Stainless steel has been used because the sink needs to be strong and durable.

Explain **two** further working properties of stainless steel that make it a suitable material for the sink when used for food preparation and dishwashing.

(4)

1 Stainless steel is water resistant ensuring that it won't rust during use allowing the individual to continue with the tasks easily and keeping the sink and surrounding area clean and neat looking.

2 Additionally, stainless steel is tough so it can handle the weight and impact of washing dishes and food preparation with folding or denning making it ideal.



ResultsPlus
Examiner Comments

This response has two fully-appropriate linked points relating to toughness and corrosion resistance.

Total: 4 Marks



ResultsPlus
Examiner Tip

In 'explain' questions, give a reason or explanation.

Question 1 (c)

This question is a three-mark 'explain' question that, in itself, increases the level of challenge.

The question required candidates to explain why rubber is a suitable material for the plug. The majority of candidates typically achieved two marks but only the more-able candidates were able to expand their explanations appropriately, to include a third, relevant, marking point.

(c) Figure 2 shows a sink plug.

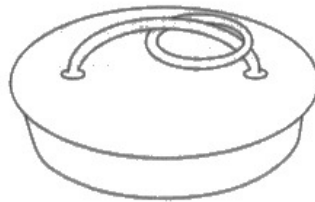


Figure 2

The sink plug is made out of rubber.

Explain **one** reason why rubber is a suitable material for the sink plug.

(3)

Having the sink plug made from rubber is because rubber is a water resistant elastomer that when fitted into the tight fit of the sink's drain, will create a seal that will stop water leaving the basin. Enabling the sink to be filled.



ResultsPlus
Examiner Comments

This is a very good clear response, awarded three marks under bullet 1 in the mark scheme.

Total: 3 Marks



ResultsPlus
Examiner Tip

For a three-mark 'explain' question, both expansion points need to relate to the original identification.

Question 2 (a)

The candidates were presented with a dimensioned drawing of an aluminium component that had been milled from a solid block of aluminium.

The question required candidates to state two other methods of producing the component from aluminium. The most common responses were extrusion, sand casting and diecasting.

Candidates performed well on this question.

This topic was included in the AI.

Here, the command verb is 'state' and a very short response is appropriate.

2 Figure 3 shows a drawing of a component that is to be manufactured for use in a consumer product. The component is to be milled from a solid block of aluminium.

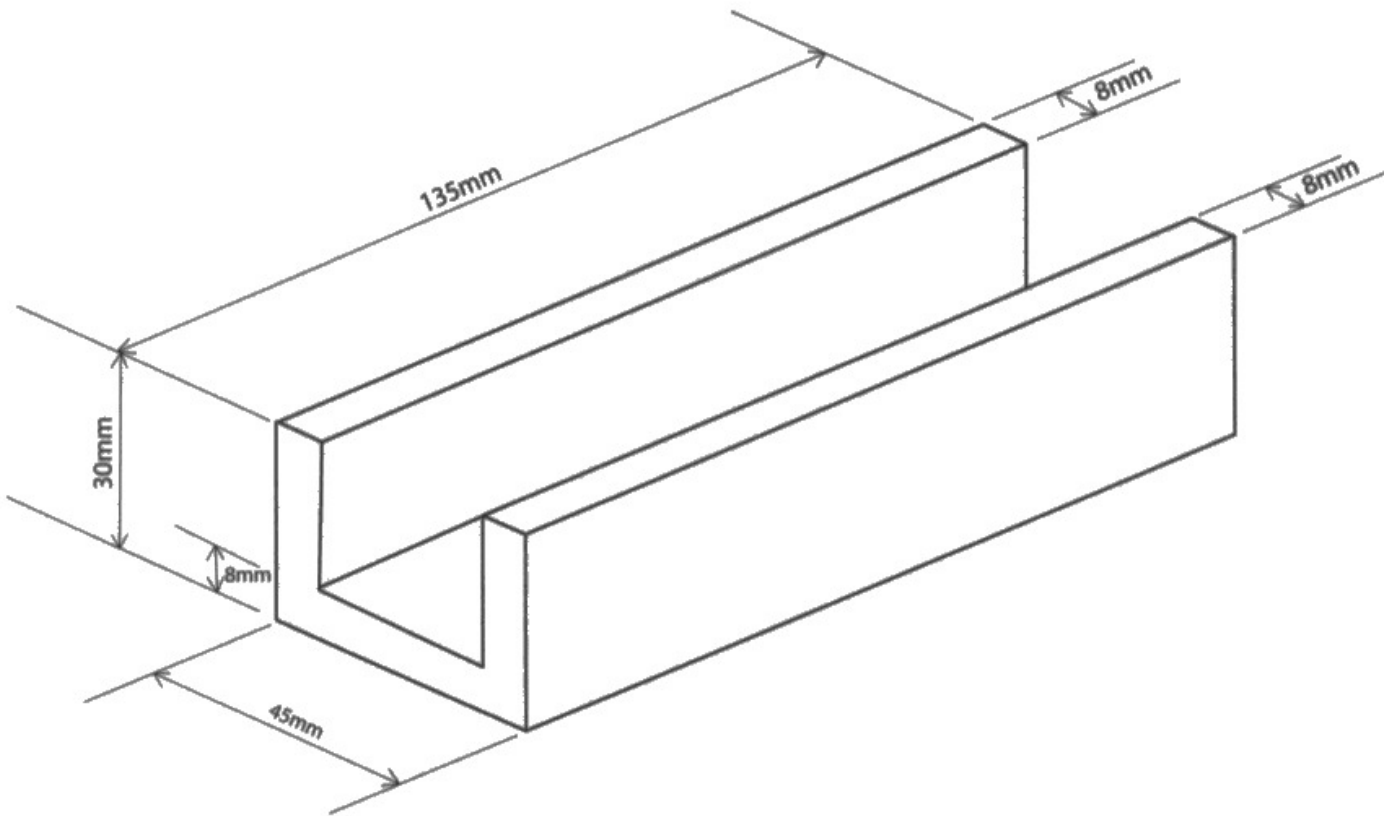


Figure 3

(a) State **two** other methods for producing the component from aluminium.

(2)

1 Sand casting

2 Die casting



ResultsPlus
Examiner Comments

Here, the candidate is awarded two marks for identifying two alternative methods of producing the component correctly.

Total: 2 marks

Question 2 (b)

The candidates were given the weight of the original solid block of aluminium and were required to calculate the weight of the finished component.

A number of approaches was seen but most used methods 1 or 3, shown in the mark scheme.

Most of the higher-achieving candidates were awarded the full five marks.

In mathematics questions, full marks are awarded for the correct answer even if no working is shown.

However, all working should be shown because if there is mistake in part of the calculation, credit will be given for the parts that are correct.

(b) The original solid block of aluminium was 135mm x 30mm x 45mm and had a mass of 492g.

Calculate the mass of the finished milled component.

Give your answer in grammes (g) to 1 decimal place.

Show all of your workings.

(5)

$$135 \times 30 \times 45 = 182250$$

$$182250 \div 492 = 370.4 \text{ mm per gram}$$

$$8 + 8 = 16$$

$$45 - 16 = 29$$

$$30 - 8 = 22$$

$$135 \times 22 \times 29 = 86130$$

$$182250 - 86130 = 96120$$

$$96120 \div 370.4 = 259.5 \text{ g}$$

Answer 259.5 g



ResultsPlus
Examiner Comments

The candidate is awarded full marks for a correct response.

Total: 5 Marks



ResultsPlus
Examiner Tip

Show your working in mathematics questions.

Question 3 (a)

The candidates were asked to explain a property of PET that makes it a suitable material for the production of a blow-moulded fizzy drinks bottle.

Most candidates were able to achieve one or two marks.

Candidates should be reminded that some properties may not always be relevant to the context of the question.

3 Figure 4 shows a fizzy drinks bottle manufactured from polyethylene terephthalate (PET).



Figure 4

Polyethylene terephthalate (PET) can be blow moulded.

(a) Explain **one** other property of polyethylene terephthalate (PET) that makes it suitable for the fizzy drinks bottle.

(2)

PET is chemical resistant. This makes it suitable as it will not react with the fizzy drink that is put inside the bottle.



This response is awarded full marks for identifying and explaining an appropriate property of PET that makes it suitable for use in a fizzy drinks bottle.

Total: 2 Marks



Remember! Link your response to the context of the question.

Question 3 (b)

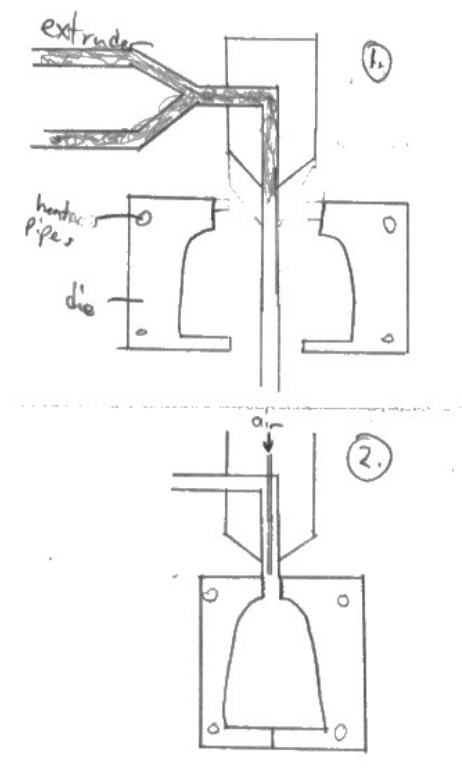
This question required candidates to describe, using labelled sketches, the blow-moulding process.

This topic was included in the AI and this fact was reflected in the quality of candidate responses. A high proportion of candidates achieved full marks.

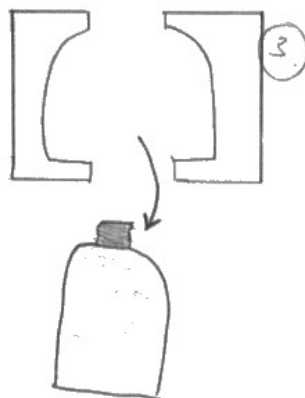
Candidates should remember that when asked to 'describe', using labelled sketches, they must provide both images and written content, in order to be awarded full marks.

(b) Describe, using labelled sketches, the blow moulding process used to produce the bottle.

(4)



1. plastic is fed into ~~the~~ a heated section to melt the plastic.
2. the melted plastic pushed through into the die.
3. the die is closed and air is blown through the tube pushing the plastic to the outer walls of the die.
4. air keeps blowing until the plastic solidifies, the die is opened and the bottle can be removed.





This was a well-drawn and well-written response that included a comprehensive description of the process.

It was awarded full marks.

Total: 4 Marks



Remember to label your diagrams, when asked.

Question 3 (c)

This question required candidates to provide two three-mark explanations of why blow-moulding has been used for the production of the bottle.

The command verb and associated mark tariff provide increased rigour.

This topic was included in the AI, however, the Assessment Objective allowed all candidates to access marks across the range.

(c) Explain **two** reasons why blow moulding has been used for the production of the bottle.

(6)

- 1 There are no seams on the plastic. This means there are no weak points that could split causing water to leak out. This creates a plastic bottle that will last long enough to be sold and used by a consumer. As the water is less likely to leak out, then customer satisfaction will increase.
- 2 This process is very quick meaning a large volume of plastic bottles can be produced. ~~This means~~ This is advantageous as plastic bottles are normally produced by ^{continuous} ~~mass~~ manufacture due to the demand from the market. This increases profits made as more bottles can be sold.



ResultsPlus
Examiner Comments

This is a good, well-written response, providing appropriately-linked reasons for why blow-moulding was used.

Total: 6 Marks

Question 4 (a)

This question required candidates to give three features of critical path analysis.

This topic was included in the AI.

- 4 A manufacturer of consumer goods is considering replacing some of its products with new and repurposed designs. This requires a lot of planning, preparation and evaluation.

(a) Critical path analysis is a planning method.

Give **three** features of critical path analysis.

(3)

- 1 Identifies tasks that have to be completed during manufacturing.
- 2 Identifies order which tasks must be completed in.
- 3 Identifies the float-tasks which can be completed whilst other tasks are ongoing.



ResultsPlus
Examiner Comments

This response receives full marks, demonstrating a sound understanding of critical path analysis.

Total: 3 Marks

Question 4 (b)

This question required candidates to outline considerations that need to be taken into account when preparing budgets, in the context of financial forecasting.

This topic was partially-covered by the advance information.

(b) Manufacturers need to undertake financial forecasts which include the preparation of budgets.

Outline considerations that need to be taken into account when preparing budgets.

(6)

Manufacturers need to consider setup costs of the operation, such as buying/renting a warehouse, buying machinery, shipping costs of machinery, maintenance costs of machinery, backup funds in case of machine breakdown/failure, materials and their transport costs, hiring employees and how many they need and their wages, cost of running warehouse with electricity/heat, export costs of materials/products, sponsor costs, advertising costs, how much funds are available if modifications/changes are made, how long will this budget last for etc.



ResultsPlus
Examiner Comments

This candidate demonstrates sound knowledge of key budget considerations, covering a broad range of points contained within the mark scheme.

Total: 6 Marks



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Examiner Tip

Six key points need to be covered for a six-mark 'outline' question.

Question 4 (c)

This question required candidates to give two forms that a trademark may take, to identify a genuine product.

A proportion of candidates confused trade marks with patents, copyright and quality markings.

(c) A trademark allows a manufacturer to provide easy identification of their genuine products.

Give **two** forms a trademark may take to identify the genuine product.

(2)

1 Patent

2 European Union trademark



This is a frequent mistake – the candidate recalls other information from the same specification topic area.

Total: 0 marks

(c) A trademark allows a manufacturer to provide easy identification of their genuine products.

Give **two** forms a trademark may take to identify the genuine product.

(2)

1 British Standards Kitemark

2 European Standard trademark



ResultsPlus
Examiners Comments

This response demonstrates a very frequent error.

Total: 0 Marks

(c) A trademark allows a manufacturer to provide easy identification of their genuine products.

Give **two** forms a trademark may take to identify the genuine product.

(2)

1 A logo

2 Colour scheme



ResultsPlus
Examiners Comments

A fully-appropriate response that is awarded full marks.

Total: 2 Marks



ResultsPlus
Examiners Tip

The command verb 'give' requires a very short response.

Question 4 (d)

This question required candidates to discuss the cost, sales, profit and market implications to the manufacturer, during the various stages of a product's life-cycle.

This topic was included in the AI.

(d) Discuss cost, sales, profit and market implications to the manufacturer during the various stages of a product's life cycle.

(9)

WHEN A PRODUCT IS INTRODUCED, THE MAIN OBJECTIVE IS TO BRING CUSTOMER ATTRACTION TO THE ITEM. THIS IS WHERE BRANDING AND QUALITY IS ESTABLISHED AND PRICES ARE KEPT TO A LOW TO ALLOW THE PRODUCT TO GAIN CONSUMERS TRUST. THE PRODUCT DISTRIBUTION IS SELECTIVE AT THIS POINT AND THE PROMOTION IS MAINLY AIMED AT INNOVATORS AS THEY ARE STILL TRYING TO GAIN ATTRACTION TO THE PRODUCT. ~~THE~~ THE PRODUCT THEN ENTERS GROWTH WHERE THE COMPANY IS TRYING TO BUILD BRAND PREFERENCES. THE PRICING IN THIS TIME CAN MAINTAIN OR RAISE DEPENDING IF ANY NEW FEATURES ARE ADDED BUT COMPANIES ENJOY MAXIMISING PROFIT WITH NO COMPETITION. QUALITY STANDARDS ARE MAINTAINED HERE AND DISTRIBUTION CHANNELS ARE INTRODUCED TO PUSH THE PRODUCT OUT AND TRY AND GAIN A WIDER TARGET MARKET THROUGH PROMOTION AND VISIBILITY. AFTER A WHILE, A COMPETITOR MAY BE INTRODUCED WHICH CAN AFFECT SALES MASSIVELY. HERE (THE MATURITY STAGE) THE COMPANY WILL TRY TO ENHANCE

THEIR PRODUCT TO DIFFERENTIATE IT FROM THE COMPETITOR. PRICES ARE LOWERED AND ALL PROMOTION IS FOCUSED ON THE NEW DIFFERENTIATIVE OF THE PRODUCT. DISTRIBUTION LEVELS HERE ARE INTENSIVE, AND COMPANIES MAY START OFFERING INCENTIVES TO PEOPLE TO ENCOURAGE THEM TO PURCHASE THE PRODUCT. IF THIS DOESN'T WORK, AND SALES CONTINUE TO FALL, THE PRODUCT ENTERS A DECLINE WHERE THE COMPANY HAS THREE ROUTES IT CAN TAKE. THEY CAN MAINTAIN THE PRODUCT, (TRY AND REJUVINATE IT AND THEN SEND IT BACK OUT), HARVEST THE PRODUCT (SLOW PRODUCTION, LOWER THE PRICE AND KEEP SELLING IT TO A LOYAL NICHE GROUP), OR THEY CAN DISCONTINUE THE PRODUCT. THEY CAN EITHER LIQUIDISE ALL MATERIALS THEY HAVE LEFT OR SELL THE PRODUCT ON TO ANOTHER COMPANY WHO IS WILLING TO CONTINUE IT.



ResultsPlus
Examiner Comments

This is an excellent, well-written response, fully covering the different stages of a product's life-cycle.

Here, the candidate provides a comprehensive discussion that makes a number of effective links between key content and demonstrates thorough understanding.

There is considered and effective application to the context of the question. Hence, full marks were awarded.

Total: 9 Marks

Question 5 (a)

This was a mathematics question, requiring candidates to calculate the radius of a sphere with a volume of 10 litres.

This required candidates to rearrange the formula for the volume of a sphere, and substitute values into the rearranged formula in order to calculate the radius.

Candidates demonstrated good mathematical skills and a large number of candidates achieved the full five marks.

- 5 A manufacturer has been commissioned to produce a solid sphere with a volume of 10 litres. The volume of a sphere can be calculated using the following formula:

$$V = \frac{4\pi r^3}{3}$$

- (a) Calculate the radius of the sphere.

$$1 \text{ litre} = 1000 \text{ cm}^3$$

Give your answer in cm to 2 decimal places.

$$10 \text{ litre} = 10000 \text{ cm}^3$$

(5)

$$10000 = \frac{4\pi r^3}{3}$$

$$30000 = 4\pi r^3$$

$$\frac{30000}{4\pi} = r^3$$

$$r^3 = 2387.32$$

$$r = \sqrt[3]{2387.32}$$

$$r = 13.37$$

$$r = 13.365$$

Answer 13.37 cm



ResultsPlus
Examiner Comments

Here, the candidate substitutes values into the formula first, before rearranging it to solve the problem and arriving at the correct answer of 13.37.

Total: 5 Marks

Remember – when a question asks for the answer to two decimal places there is a mark included for doing so, but also remember to use correct mathematical rounding.

- 5 A manufacturer has been commissioned to produce a solid sphere with a volume of 10 litres. The volume of a sphere can be calculated using the following formula:

$$V = \frac{4\pi r^3}{3}$$

- (a) Calculate the radius of the sphere.

$$1 \text{ litre} = 1000 \text{ cm}^3$$

Give your answer in cm to 2 decimal places.

(5)

$$V = \frac{4\pi r^3}{3}$$

$$3V = 4\pi r^3$$

$$\sqrt[3]{\frac{3V}{4\pi}} = r$$

$$r = \sqrt[3]{\frac{3(10000)}{4\pi}}$$

$$r = 13.365$$

$$r = 13.37$$

Answer 13.37 cm



ResultsPlus
Examiner Comments

Here, the candidate rearranges the formula before substituting values and solving the equation.

Total: 5 Marks

Question 5 (b)

This was a mathematics question requiring candidates to calculate the mass of a sphere using a supplied formula $M = V \times D$.

The question also required a unit conversion.

- (b) The sphere is to be made from aluminium which has a density of 2.7 tonnes per m^3 .

Calculate the mass of the 10 litre sphere in kilogrammes (kg).

1 tonne = 1000 kilogrammes (kg)

Use mass (M) = volume (V) \times density (d)

$$m = vd \qquad 0.01 \times (2700) \\ = 27 \text{ kg}$$

(3)

$$V = 10000 \text{ cm}^3$$

$$\frac{\quad}{100^3}$$

~~10000~~

$$V = 0.01 \text{ m}^3$$

Answer 27 kg



ResultsPlus
Examiner Comments

Here, the candidate is awarded full marks for calculating the mass of the sphere correctly.

Total: 3 Marks



ResultsPlus
Examiner Tip

Remember you can usually do unit conversions either at the beginning or the end, of a calculation.

Question 6 (a)

This was a very accessible question.

The question required the candidate to name two marking-out tools used to mark out the mortise and tenon joint shown in figure 5.

Candidates generally did very well on this question. The most frequent incorrect answers were the naming of marking-out tools used for the marking-out of metals.

This topic was included in the AI.

When the question is about tools and equipment, make sure your response is appropriate to the context of the question, in this case, a wood joint.

- 6 Figure 5 shows a wood joint that is to be used on a single piece of furniture. The joint will be positioned and marked out using a pencil and other marking out tools.

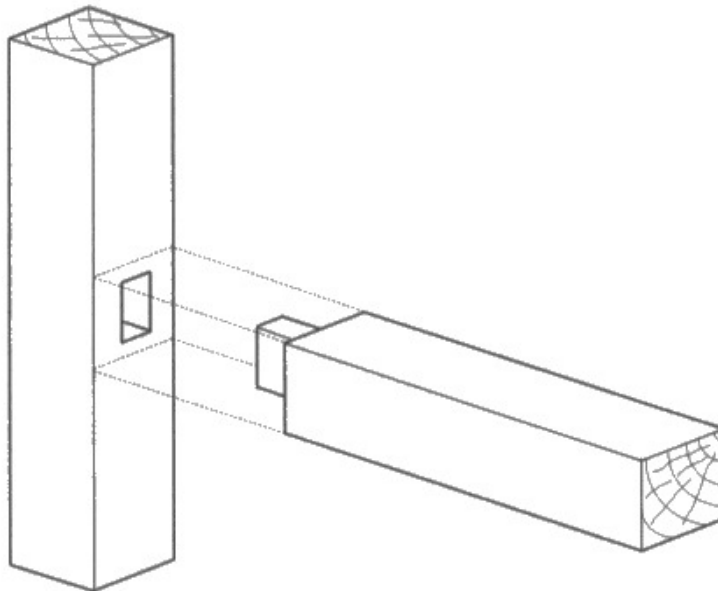


Figure 5

- (a) Name **two** other marking out tools used to position and mark out the joint accurately and efficiently.

(2)

1 Odd leg Callipers

2 Scribe



Here, the candidate names two tools used for the marking-out of metals.

They are inappropriate for marking out a woodwork joint, hence zero marks are awarded.

Total: 0 Marks



Make sure you answer the question that is asked.

- 6 Figure 5 shows a wood joint that is to be used on a single piece of furniture. The joint will be positioned and marked out using a pencil and other marking out tools.

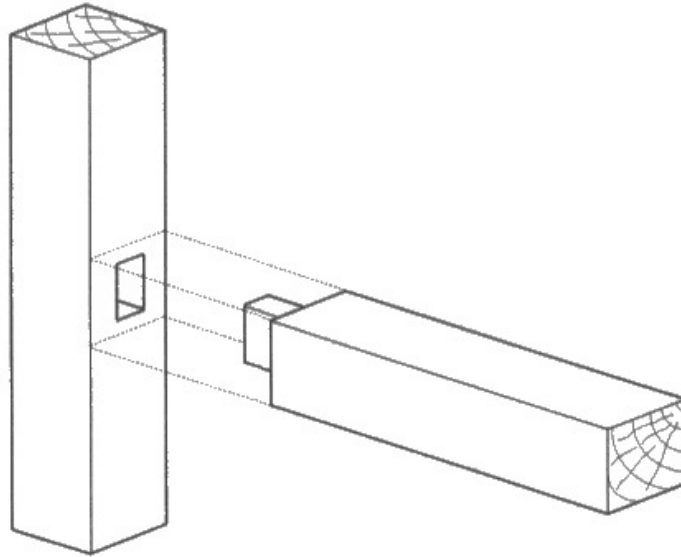


Figure 5

- (a) Name **two** other marking out tools used to position and mark out the joint accurately and efficiently.

(2)

1 engineers square

2 punch / scribe



ResultsPlus
Examiner Comments

Here, the candidate has also identified, incorrectly, two marking-out tools appropriate to the marking out of the joint.

At A Level, it is expected that candidates should know the correct tools for use when working in wood. Hence zero marks are awarded.

Total: 0 Marks

- 6 Figure 5 shows a wood joint that is to be used on a single piece of furniture. The joint will be positioned and marked out using a pencil and other marking out tools.

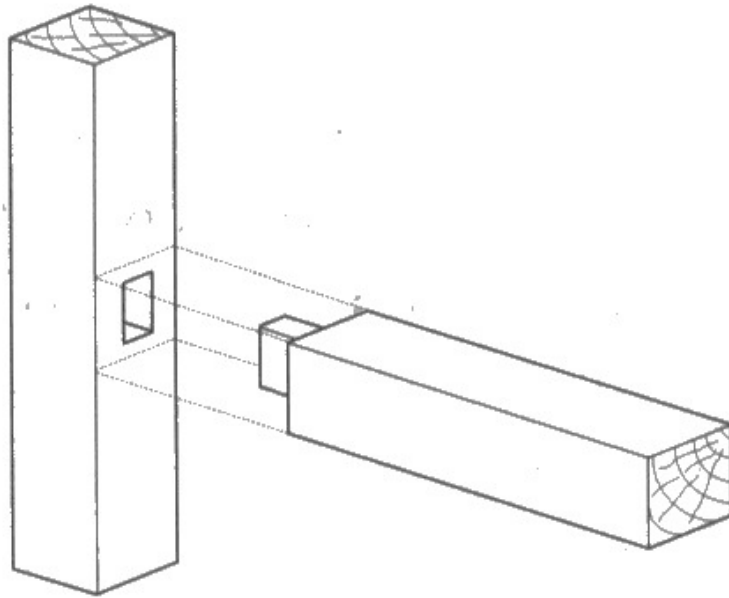


Figure 5

- (a) Name **two** other marking out tools used to position and mark out the joint accurately and efficiently.

(2)

1 marking gage

2 try square



ResultsPlus
Examiner Comments

Here, the candidate identifies correctly two appropriate woodwork marking-out tools, albeit with some spelling mistakes.

Full marks are awarded.

Total: 2 Marks

Question 6 (b)

This question required candidates to explain two reasons why batch production would be used for the manufacturing of 50 identical pieces of furniture.

This topic was included in the AI and candidate knowledge reflected this. This question is, however, a three-mark 'explain' question which, in itself, increases the level of challenge.

(b) The manufacturer has received an order for 50 identical pieces of furniture.

Explain **two** reasons why batch production would be used for the manufacturing of the furniture.

(6)

1 It can be flexible and respond to trends. As batch production produces a set number of products it can be changed frequently. If the furniture becomes untrendy or a new and improved design is created then the process can be altered to match this.

2 It prevents waste. Due to only a set number of products produced, excess and unwanted products don't have to be stored and thrown away. This reduces costs for the manufacturer.



ResultsPlus
Examiner Comments

This is a good response with two appropriately-linked three-mark explanations. Hence, full marks are awarded.

Total: 6 Marks



ResultsPlus
Examiner Tip

Remember: for each explanation, both expansion points need to relate to the identified reason.

Question 6 (c)

This question required candidates to discuss the significance of health and safety laws and regulations, to the manufacturer of furniture produced in a small workshop environment.

This topic was included in the AI.

In a discussion question, do not just list, or bullet point, issues: discuss the issues in a balanced way, within your response.

(c) The furniture is manufactured and finished in a small workshop environment.

Discuss the significance of health and safety laws and regulations to the manufacturer of the furniture.

(6)

The health and safety act of 1974 should be in place that requires a risk assessment to be done in the workshop highlighting any risks and how these are reduced, showing the employee how to properly use machinery. Personal protection equipment should also be given to the employee as stated in the PPE act of 1992, PPE includes anything worn or held to protect the employee, it should be maintained and repaired by the employer to protect the employee. Signage should be placed around the workshop as stated in the signage act of 1996, this means anything dangerous should have a sign, if PPE must be worn, for a first aid kit, fire extinguisher or anything that must not be used should all have clear to view signs, the manufacturer should have all signs clearly shown where needed.

The health and safety act is also in place to protect those not in the workshop both those around employees so the manufacturer should provide ventilation and eye protection for the employee but also a covering to prevent taking large amounts of dust home. The manufacturer must provide the employees with necessary PPE along with showing them how to use it correctly.



Here, the candidate provides a comprehensive discussion that makes a number of effective links between key content, and demonstrates a thorough understanding.

There is considered and effective application to the context of the question. Hence full marks are awarded.

Total: 6 Marks



'Discuss' questions need a balanced response.

Question 6 (d)

This question required candidates to name two natural fibres that could be used to make some cushion covers.

Almost all responses named natural fibres covered within the specification and mark scheme. Occasionally, other correct responses were seen, for example, hemp.

The majority of candidates achieved full marks.

Each piece of furniture will be sold with separate padded cushions that have textile covers.

(d) Name two natural fibre textiles that could be used for the cushion covers.

(2)

1 Cotton

2 ~~hemp~~ Silh.



ResultsPlus
Examiner Comments

This is a correct response and receives two marks.

Total: 2 Marks

Candidates should read the question carefully. The key word here was 'fibre'.

Each piece of furniture will be sold with separate padded cushions that have textile covers.

(d) Name **two** natural fibre textiles that could be used for the cushion covers.

(2)

1 leather

2 suede



ResultsPlus
Examiner Comments

Whilst leather and suede are not a manufactured fabric, neither are they natural *fibre*, being obtained from animals.

Hence, zero marks are awarded.

Total: 0 Marks



ResultsPlus
Examiner Tip

Read the question.

Question 6 (e)

This was a mathematics question, requiring candidates to calculate the maximum number of cushion covers that could be manufactured from one roll of fabric.

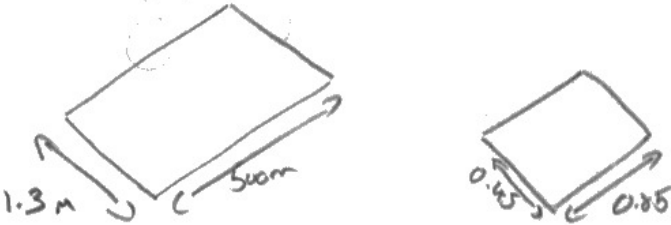
This proved to be a very accessible question, with a large number of candidates accessing the maximum marks available.

Remember! In mathematics questions you are awarded full marks for the correct answer even if no working is shown.

However, you should show all your working because if you make a mistake in part of the calculation you will receive credit for the parts that you have done correctly.

- (e) The textile fabric is in rolls 500m long by 1.3m wide. Each cushion cover requires a single piece of fabric 0.45m by 0.85m.

Calculate the maximum number of cushion covers that can be manufactured from one roll.



(3)

$500 \times 1.3 = 650 \text{ m}^2$

$0.45 \times 0.85 = 0.3825 \text{ m}^2$

$\frac{650}{0.3825} = 1699.34$
 $= 1699$

Answer 1699



ResultsPlus
Examiner Comments

Here, the candidate receives full marks for the correct answer.

Total: 3 Marks



ResultsPlus
Examiner Tip

Always show your working.

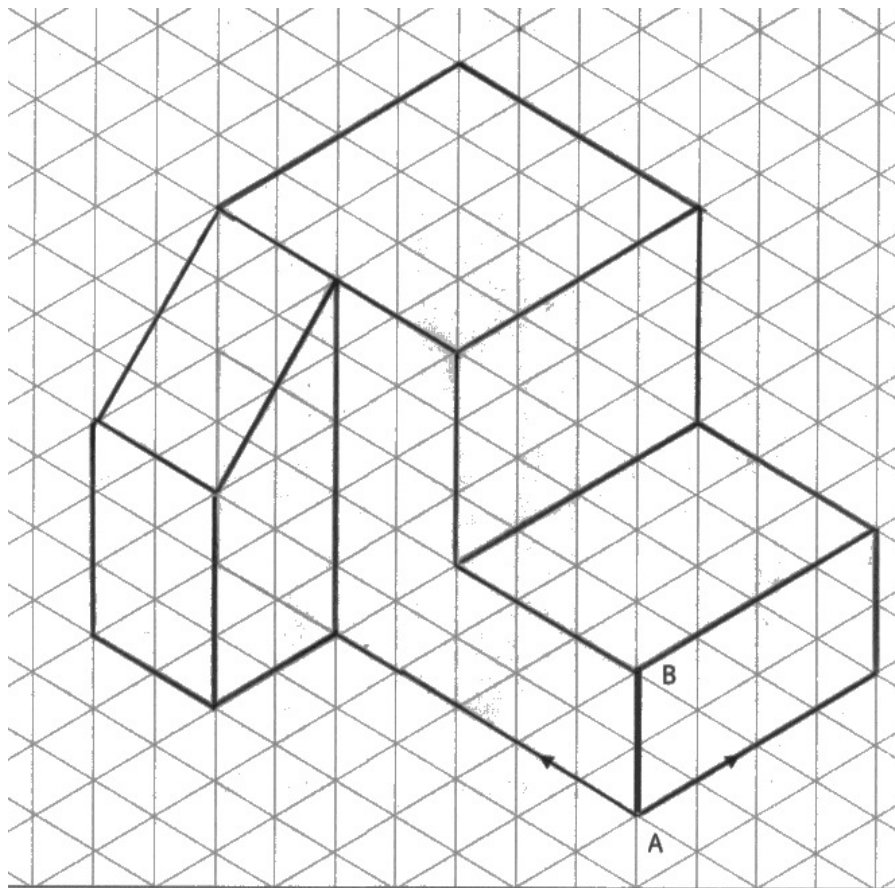
Question 7

This question was a graphics question.

Candidates were presented with a component drawn in 3rd angle orthographic projection.

They were required to produce an accurate isometric drawing of the component, on an isometric grid, with the front corner and starting point shown.

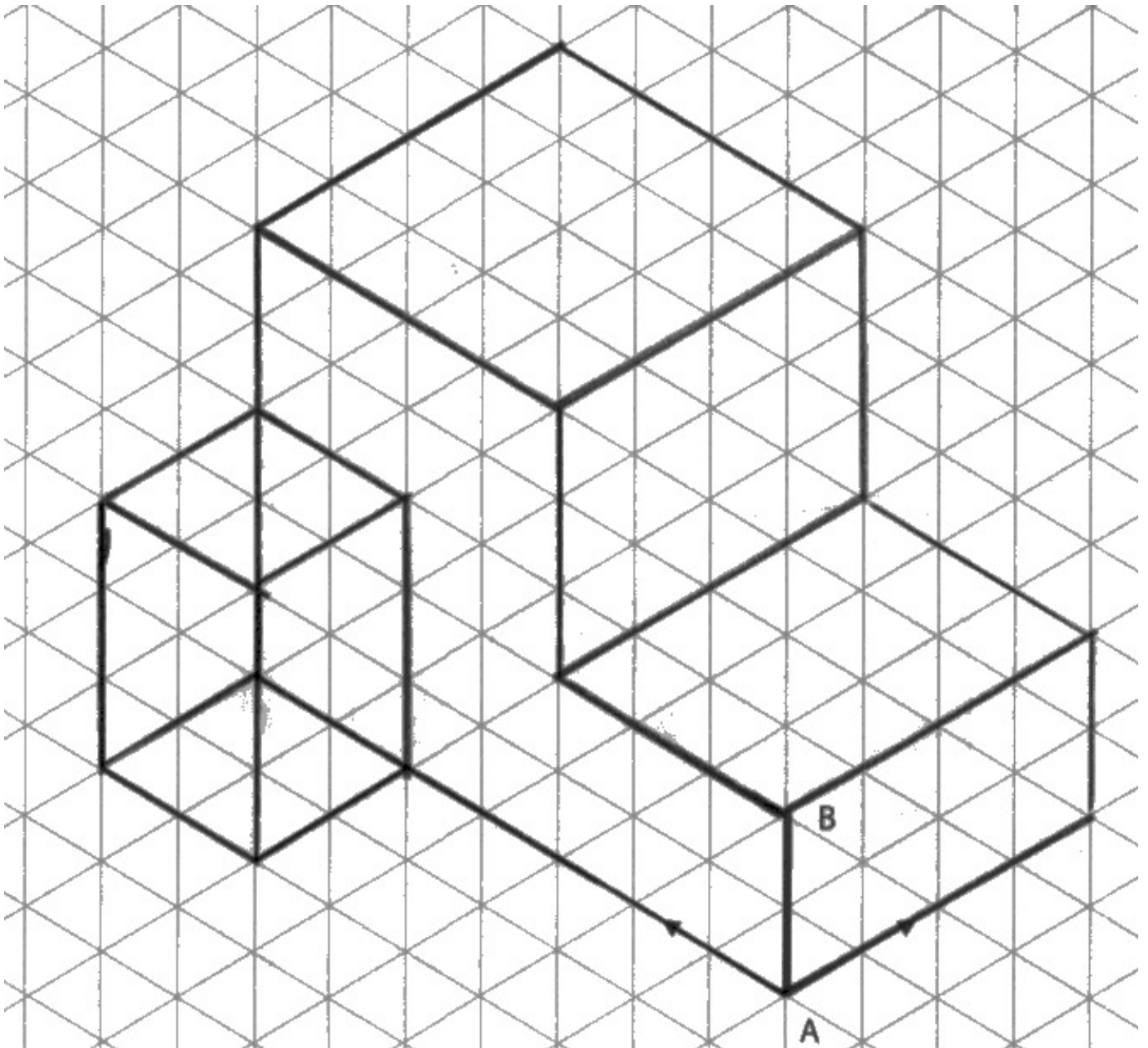
The nature of the assessment allowed all candidates to access marks commensurate with their ability.



This is a good response, drawn with precision and accuracy, to scale, with appropriate and consistent line style.

The response is awarded full marks.

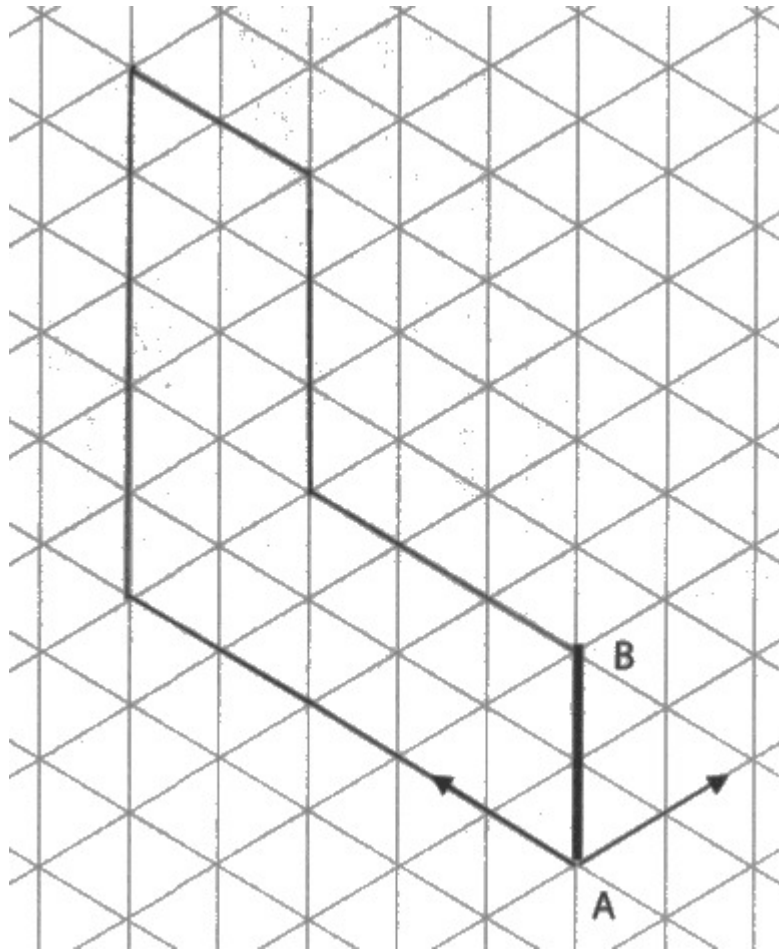
Total: 6 Marks



ResultsPlus
Examiner Comments

This response is awarded a mark of 4, at the top of Level 2 because it is not fully accurate. It omits the sloping section to the left of the drawing and has some additional lines that should not be visible.

Total: 4 Marks



ResultsPlus
Examiner Comments

This response was awarded one mark.

This is the most basic response, that goes sufficiently beyond 'no rewardable content' to be awarded a mark.

Total: 1 Mark



ResultsPlus
Examiner Tip

Remember: if you are unsure of a question, try it. You may receive some marks.

Question 8

This question covered the style and design philosophy of the Arts and Crafts design movement.

External and internal photographs of William Morris's Red House were provided as visual stimuli. Candidates were used to this style of question, covering the design movements.

Candidates generally performed as expected and the question covered the full range of academic ability in an appropriate way.

Discuss the style and design philosophy of the Arts and Crafts movement and how it may have influenced the house design shown in Figures 7 and 8.

(9)

The arts and crafts movement led by William Morris was a reaction against industrialisation and it followed a mostly ~~form~~ function before form philosophy, he also said 'don't have anything in your house you don't believe to be useful or perceive to be beautiful'.

Based on this in the photos it can be ^{seen} that the house has a good structure and small use of natural forms for ornamentation. On the outside we can see that there is a small well structure which uses the natural wood grain for its beams, both functional and using natural beauty. The outside of the house has a small archway in a leaf shape made of brick, this is taken inspiration from nature.

On the inside of the house there is a rug which has floral design that is also inspired by nature and adds a small amount of ornamentation to the room, similarly the wallpaper has leaf shapes as it brings the idea of celebrating the beauty in nature. The house uses a lot of wood which has natural beauty with nice grains and ~~it is~~ the stairs are slightly ornamented with the handrail having been shaped this is both functional and has an element of beauty and design.



This is a good response that is awarded a high mark.

The candidate provides a comprehensive discussion that makes effective and appropriate links to the visual stimuli in the question.

Total: 8 Marks

Question 9

The question shows an image of a modern smart watch.

Candidates were required to discuss how modern technology and miniaturisation of components have enabled the development of smart watches.

This topic was included in the AI. Such inclusion was reflected in the question's performance, which was appropriately targeted across the grade range.

- 9 Figure 9 shows a modern smart watch that offers a wide range of functions such as fitness tracking, health monitoring, calendars and music.



Figure 9 Modern Smart Watch

Discuss how modern technology and miniaturisation of components have enabled the development of smart watches.

(9)

Miniaturisation has been enabled by advanced integrated ~~stages~~ circuits which allow for the storage of more circuitry per microchip, increasing its power and functionality, advanced battery technology such as lithium-ion cells which allow for large amounts of energy in a compact manner, and advanced LCD's which allow for more colourful screens (due to varying voltage) that are also thinner and more energy efficient to be used. All these features can be seen on the smartwatch as the advanced IC's give the watch the ability to track fitness, monitor health, show calendars and music alongside telling the time, the advanced battery technology keeps the ~~size~~ size of the watch compact as seen in photo whilst providing sufficient energy to enable its ~~to~~ multi-functionality and the advanced LCD's can be seen by the screen having

good image and colour quality in an energy efficient way, with thin screens to suit such a small product. There are other smart materials that have been pivotal in the design of miniature products such as the smart watch, an example being small piezoelectric crystals which when supplied a current is stressed, which gives these crystals the ability to convert mechanical stress to electrical signals and vice-versa, a useful function in these products. Another example is Quantum Tunneling Composites - which when exposed to certain stimuli goes from being an electrical insulator to an electrical conductor, with its level of conductivity being proportional to how much it contracts due to stimuli, functions that are pivotal in these products whilst it is also incredibly easy to integrate, reusable and cheap to manufacture so costs of products like the watch aren't extortionate.



ResultsPlus
Examiner Comments

This is a good response that is awarded eight marks, which is the middle of Level 3.

The candidate has focussed appropriately on the technology and miniaturisation that makes possible the existence of smart watches.

Total: 8 Marks



ResultsPlus
Examiner Tip

Focus on the context of the question.

Question 10

This question required the candidates to explain three advantages, to the user, of purchasing glasses with photochromic lenses.

The question style of three-times 3-mark explanations in itself has added rigour. Generally, candidates were able to demonstrate sound knowledge of photochromic glass within the context of the question.

This topic was included in the AI. It reflected relatively strong candidate performance.

10 Photo-chromic lenses are becoming a popular choice for people who wear glasses to correct their eyesight.

Explain **three** advantages to the user of purchasing glasses with photo-chromic lenses rather than standard lenses.

(9)

- 1 Protects eyes - photo-chromic lenses react to a change in light of the area the wearer is in. These are useful as they can protect the eyes of the user by blocking the harmful UV rays from the sun, while still having the lenses needed for their prescription.
- 2 Convenience - another reason that photo-chromic lenses are useful for the user is the convenience. When going to and from differently lit areas, photo-chromic lenses will adapt quickly and efficiently for the wearer. They do not need to carry around a pair of UV protective sunglasses, or have to inconveniently swap between them.
- 3 Cost - although glasses with photo-chromic lenses are more expensive than standard glasses, they are less expensive overall if the user was to purchase standard glasses and UV protective glasses (sunglasses) for visually impaired.



ResultsPlus
Examiner Comments

This is a good response, where the candidate provides three appropriately-linked responses, and it was awarded full marks.

Total: 9 Marks

Question 11

This was the standard format of the final question on the paper

The question required candidates to evaluate the performance of a reclining armchair and footstool, with reference to aesthetics and user requirements.

This question was mapped across the specification, including some aspects covered by the advance information.

The question performed fully, as expected.

The chair has a steel frame and reclining mechanism, laminated beech base and legs, and flame resistant foam cushions that are covered in leather.

Evaluate the performance of the reclining armchair and footstool with reference to aesthetics and user requirements.

①

②

(12)

One way in which the aesthetics of the armchair ~~may be improved~~ are satisfactory for a potential stakeholder is demonstrated by how the chair uses laminated beech supports for the base and legs, which adds another level of detail to the design. The curved edge edges and sweeping lines that are rotationally symmetrical and linearly symmetrical about the centre of the chair match the way in which the leather cushions are positioned both in an ergonomic manner and with curved geometry, similar to the base of the chair. However, this may not entirely improve the aesthetics of the chair, since the beech may not match the colours and texture of the leather cushions and therefore may look more jarring to the eye, which could make it more unappealing in a retailer as the complex geometry of the supports makes the top half of the chair look much more different from the bottom half. In essence, the aesthetics of the armchair are affected positively by the matching shapes, but the texture and patterns of the chair may take away from the overall desired effect.

One way in which the user requirements of the armchair and footstool are of a good standard is because the chair has many different methods of adjusting to the user's specific anthropometrics. As shown in Figure 10, the chair has a tension

adjuster/lock that allows the seat to rotate in any direction necessary, and move into a lower position for reclining. This ability to change shape in accordance to the user's needs, wants and values is essential to providing an accessible experience for the user, no matter their age group, ethnicity and/or demographic.

Furthermore, the steel frame of the chair and how the cushions are resistant to flames means that the chair is likely to have a longer lifespan (therefore making it more sustainable & ethical in the eyes of a stakeholder) and be safer to use, because the chair would be able to be placed near a fireplace (due to its environment of use) without the worry of the fabric catching fire and becoming a serious health risk. ~~However~~, The leather cushions also provide a more luxurious and comfortable experience while sitting in the chair, and the footstool positioned at a reasonable height due to extensive anthropometric research means the ease-of-use and user satisfaction of the chair & stool are greatly improved. However, these factors may not fully benefit the ease-of-use of the product, because the use of the leather cushions makes them much more difficult to clean and maintain, and the adjuster made from beech could mechanically fail after prolonged use and weight/stress has been imposed on the product. The product is also not resistant to moisture or spills, because the steel frame could rust if exposed to moisture and cause the structural integrity of the product to decrease, which decreases the lifespan of the chair (stool and could make it more unsafe to use. (Total for Question 11 = 12 marks)



This is a very good response and is awarded full marks.

The candidate applies a comprehensive understanding of design technology to the evaluation of the product.

They provide insightful analysis, in a well-balanced evaluation, supported by relevant observations throughout the response.

Total: 12 Marks

Paper Summary

Overall, the candidates performed very well. Very few blank responses were seen and the provision of advance information had clearly helped candidates to avoid slippage of performance following the pandemic.

Based on this examination, centres are offered the following advice for future preparation of their candidates.

- Remember the completion of your coursework will also support your examination performance, so think about what you have learned about materials and their properties when completing coursework
- Consider any methods or processes you undertake whilst completing coursework – always think ‘could I describe this process using notes and sketches’
- Plan your revision, effectively breaking down the course into small manageable chunks
- Practice drawing skills needed for the examination eg isometric, orthographic, nets etc. Remember drawings are often presented in one format and you have to produce a drawing of the same object in another format. In this paper, candidates had to convert from orthographic to isometric
- Remember to learn the features, principles and approaches of the historic design movements. This may help you in many ways throughout assessments, not only on questions about specific design movements but all evaluative and design-based questions

Grade boundaries

Grade boundaries for this, and all other papers, can be found on the website on this link:

<https://qualifications.pearson.com/en/support/support-topics/results-certification/grade-boundaries.html>

