



Examiners' Report

June 2022

GCSE Design and Technology 1DT0 1B

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Introduction

This is only the second time that a full cohort of candidates has taken the reformed (9-1) GCSE Design Technology given the disruptions to learning because of COVID.

There are six different material specialist papers on offer, each with a common core in Section A which was worth 40 marks and a Section B worth 60 marks based on one of the six material areas; Metals, Papers and Boards, Polymers, Systems, textiles and Timbers.

Question 1 (a)(i)

A generally well answered question, with a good number of candidates offering a correct response, mostly related to the aluminium being resistant to rust or corrosion, all appropriate within the context of the question.

It is important to stress here that these opening four small questions are about the properties of materials in the context of the product or component given in the table and therefore generic properties will not be accepted. Candidates often stated characteristics of materials instead of properties. A clearer understanding of the difference between these is needed.

Question 1 (a)(ii)

This question was not well answered well by many candidates with most incorrect answers relating to the hat keeping the sun off your face.

Correct answers referred to softness or insulator of heat.

Question 1 (a)(iii)

Most candidates answered this question correctly with transparent being the most popular answer seen. Some candidates made reference to what the tracing paper was used for, being able to place over a drawing to copy, which is not a property but an application.

Question 1 (a)(iv)

The most common responses related to the plywood being flexible or capable of being bent. Fewer references were seen in relation to it having good compressive strength.

Question 1 (b)

A generally well answered question, with many candidates scoring at least 1 mark. Most responses referred to urea formaldehyde being a thermosetting polymer / plastic with some being able to go onto link how this makes it difficult to recycle for example. Many other responses were about the material being brittle.

Question 1 (c)

The first of the maths based questions where very many candidates were able to correctly work out the mass of 32.5 kg using some form of ratio calculation.

Question 2 (a)

This question was overwhelmingly well answered with oak being the most popular response by some margin. Occasionally candidates suggested materials such as plywood or had given mahogany as an answer, which of course was given in the question.

Question 2 (b)

This was answered reasonably well with the most common answers being responses related to toughness and responses related to hardness. It is important to recognise here that any linked justification of that working property must be correct in relation to the property initially stated in the response.

Question 2 (c)

This question worked well being the first question on the paper that could be considered a significant discriminator of candidate ability. The focus on the manufacturer should have provided a focus to the response and in many instances, it proved to be the case where candidates made reference to the product being unique allowing the manufacturer to charge more.

Question 2 (d)

This was a mathematics question that provided slightly more challenge, especially at the point at which unit conversion took place making the numbers manageable for candidates.

The part of the question that was most challenging for candidates was the conversion of units within the context of a cross sectional area rather than conversion on a linear measure, hence the large proportion of almost correct answers 6, 60, 600, 6000 etc.

It is important to note here that candidates should always be encouraged to show their full working out for all maths questions. In this instance if a candidate has an answer of £6 it was still possible to be able to award 3 of the 4 marks due to error carried forward (ECF) with the issue being related to the conversion of units.

Question 3 (a)

A good number of candidates were correctly able to identify the circuit symbol as an LED or Light Dependent Resistor. Some candidates had responded with LDR or simply that it was a diode.

Question 3 (b)

A mixed set of responses from candidates. The most common correct answer seen related to the increase or decrease of rotary speed. A small but significant number realised that a reduction in speed would increase the level of torque. The most common incorrect response related to increase in power.

Question 3 (c)

Nearly all candidates attempted this question with a reasonable proportion getting the correct answer of 1600 or the 1 mark special case response of 800 due to them only calculating one of the two increases rather than a compound increase. The most common incorrect response was 200rpm. Almost all candidates appeared to have some grasp of the concept of gear ratios and their impact on output speed even when they calculated a reduction rather than an increase in speed.

Question 3 (d)

This appeared to be a very well answered question with candidates most commonly coming up with a response alluding to portability and not needing to be near an electrical outlet or responses related to no power lead resulting in improved safety due to no trailing cables.

Question 3 (e)

A mixed set of responses providing further discrimination between grades.

The most common correct responses related to the lightweight nature of carbon fibre allowing the user to work for longer because it is less tiring.

Question 4 (a)

Generally answered well with a reasonable proportion of candidates demonstrating knowledge of agro-textiles especially in relation to protecting crops from pests eating them and how they are used to protect against adverse weather conditions. There were misconceptions about the use of agro-textiles being used to make clothes for farmers and farm workers.

Question 4 (b)

A mathematics question with a very large proportion of candidates being awarded full marks for a correct answer of 7 that had been calculated using a range of methods.

Question 4 (c)

This question worked very well as a discriminator at the end of section A. The question performed well by providing a range of responses about fair trade across the whole range of marks available.

Question 5 (a)

This is the first question in Section B of the examination. The question follows a similar style to that used in each of the previous series, with an existing design being presented that candidates needed to improve to meet further specification requirements.

Candidates found some of the specification points challenging to address, such as relocating the sign from one location to another. Many candidates identified how the sign could be hung on a hook, but not how it could be easily moved elsewhere. Similarly candidates did not always explain how the disc indicating the flavour could be kept secure but also replaced when needed.

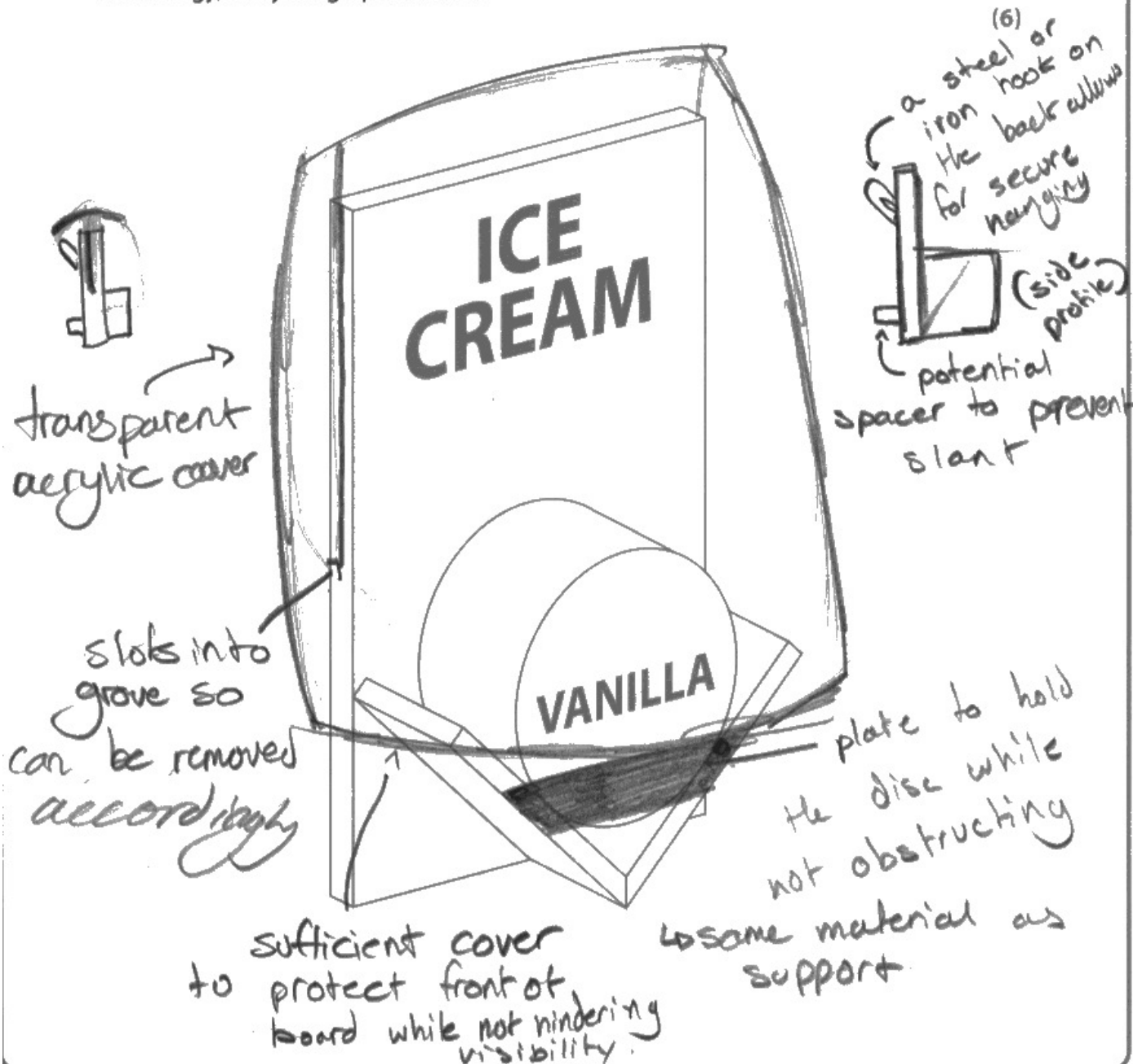
(a) The display sign holds advertising discs that show what flavour of ice cream is on sale and needs to be improved to include the following specification points.

The display sign must:

- hold the disc securely and allow the disc to be easily changed when a different flavour of ice cream is being sold
- include a cover that protects the backing board and support and prevents the disc from being affected by wind and rain
- be able to be hung up on a hook near to the ice cream and easily moved to another hook when ice cream is being sold at a different location.

Use notes and sketches, on the outline below, to show how the display sign could be modified to include these three specification points.

You will be marked on how you apply your understanding of design and technology, not your graphical skills.





In this example the candidate has met some of the specification requirements in their improved design. This type of response was typical of many candidates.

In the modified design there is evidence of:

- how the disc is held securely
- cover that protects the backing board and support
- a cover that prevents the disc from being affected by wind and rain
- being able to be hung up on a hook near to the ice cream

The annotations explain how these points have been met.

Where marks have not been awarded there was insufficient evidence of how the disc could be removed or how the sign could be relocated elsewhere.



Candidates should make sure that their sketches and annotations indicate how both parts of the specification points are met.

Question 5 (b)

Candidates tended to respond well when answering this question.

The tea-cup shaped money box allowed candidates of all levels to provide some analysis of the good or poor aspects of the design. They tended to identify factors such as the transparent screen to see the money and encourage further saving. As is often the case where two explanations are required, some candidates gave repeated points which limited the marks they were awarded.

(b) Figure 7 shows a money box made from a polymer in the shape of a tea cup. The tea cup has a design on the front that has been applied using sublimation printing.

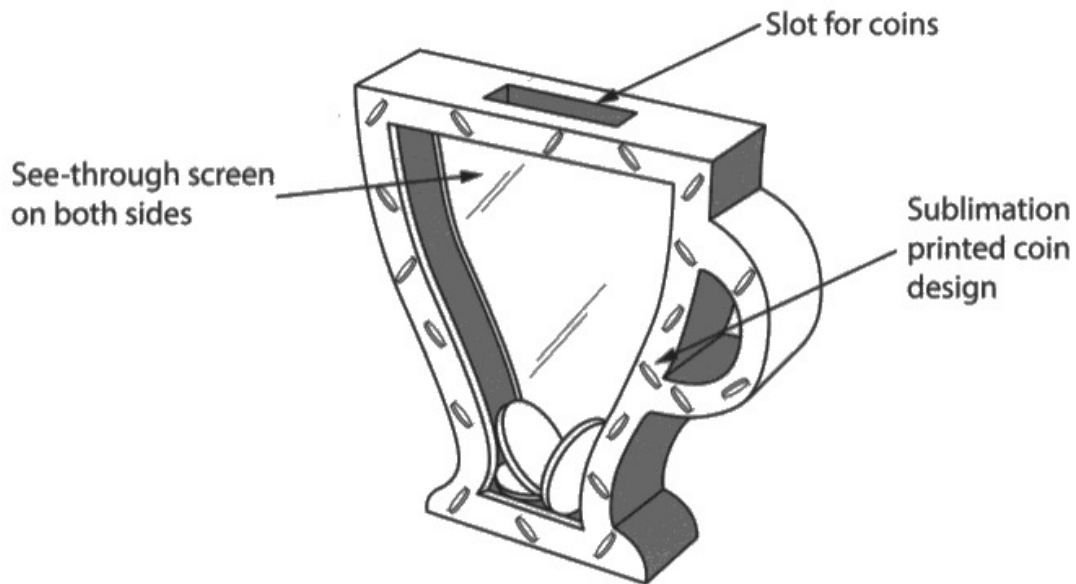


Figure 7

Explain **two** ways that the money box meets, or fails to meet, the criteria of providing a method to encourage young children to save money.

(4)

1 The money box has a see-through screen on both sides which allows the children to see how much money is inside. If it is empty they will want to fill it.

2 The box seems to be very small and narrow so it doesn't seem to fit many coins. A child can easily fill it in a few weeks then continue to ~~use~~ not save money and use a lot of money.



This response was awarded four marks. There are two discrete answers that are both justified with appropriate expansion points.

Although not required by the question, in this case the candidate has identified one way in which the money box meets the given criteria, and one way that it does not.



When answering explain questions candidates should provide a justification of their initial statement.

Where two explanations are asked for it is important that the points made are significantly different and do not overlap.

Question 6 (a)

The focus of the question was on the use of stock sized materials for the pages of a wedding guest book. A significant proportion of candidates concentrated their answers on the material itself, as opposed to the standard sized sheets which were referenced in both the stem of the question and the question itself. Such answers attained no marks.

Where candidates responded appropriately, answers such as less waste, no need for cutting and responses related to availability were common.

6 Figure 8 shows a wedding guest book.

The guest book has front and back covers that have been made from 2 mm thick folding boxboard.

Bonded paper has been used for pages of the guest book.

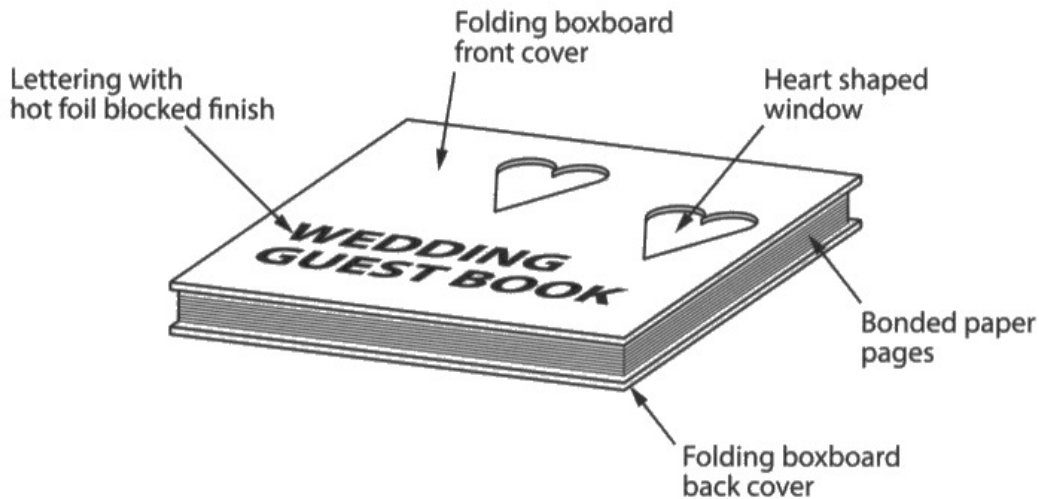


Figure 8

The pages of the wedding guest book are manufactured from standard sized sheets of bonded paper.

(a) Explain **two** advantages for the manufacturer of using standard sized sheets of bonded paper for the pages.

(4)

1 Standard sizes are easy to find as they are commonly used amongst various different products and used in our daily lives.

2 Standard sizes are also cheap compared to custom sizes because they are widely used and therefore do not require extra work such as measuring. Also provided in various stock forms.



This response was awarded 2 marks.

Each answer has an identification point, however neither of these are appropriately justified.

In the first answer the candidate has identified that standard sized are easily to find, which is an interpretaion of readily available.

In the second answer the candidate has recognised that standard sized sheets are cheaper than custom sized sheets.

Question 6 (b)

Many candidates found this particular question to be challenging and did not respond with answers linked to cutting out the heart shapes. In many cases answers considered the marking out activities as opposed to cutting out the shapes.

Often candidates achieved marks for reference to the use of a craft knife, cutting mat and safety rule. It was rare to see learners identify other specialist cutting tools, such as compass cutters.

Most candidates used notes and sketches even if their answers related to marking out which was positive.

(b) Figure 9 shows a window that is cut through the front cover of the wedding guest book.

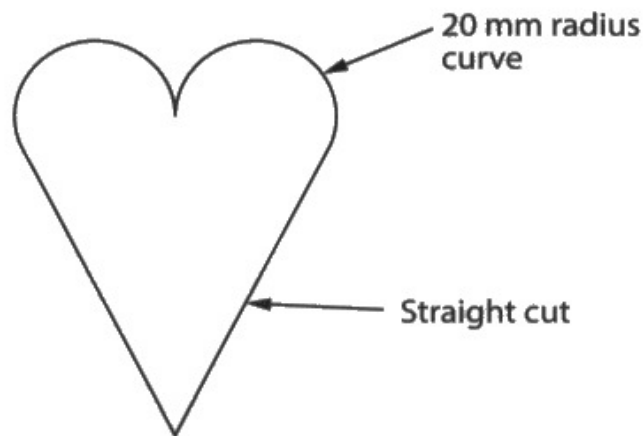
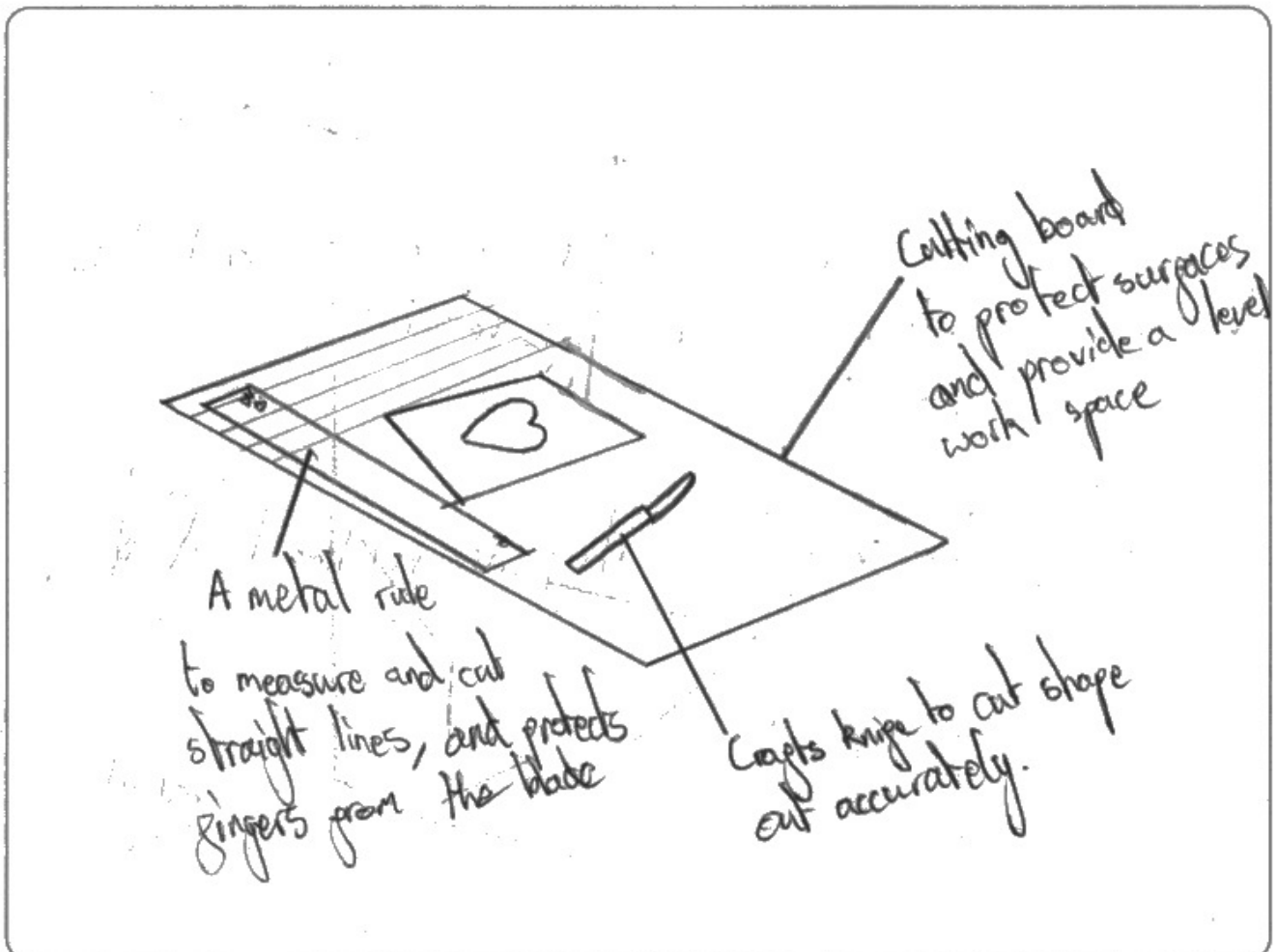


Figure 9

Use notes and sketches, in the space below, to show how the window in the front cover would be accurately cut out using hand tools.

You will be marked on how you apply your understanding of design and technology, not your graphical skills.

(4)





This example achieved three marks.

The candidate has been awarded marks for the following features being shown in the notes and sketches:

- the cutting board – this was acceptable for cutting mat
- craft knife
- metal rule – this was accepted as there was reference to protecting fingers.



When a question asks for notes and sketches both of these must be included to be able to access the full range of marks.

Where a question is worth 4 marks it would be typical that four features need to be included either in the notes or the sketches.

Question 6 (c)

Candidates generally responded well to this part question which asked them to explain one reason why hot foil blocking has been used for the lettering on the cover of the wedding guest book.

In many instances one mark was awarded for reference to lettering standing out or giving a premium/more expensive look. Linked responses were also relatively common with this being an area of content that is probably more familiar to candidates and something that they are likely to have first-hand experience of.

It was however clear in a proportion of responses that candidates lacked awareness of finishing techniques.

- (c) The lettering on the front cover of the wedding guest book has been produced with hot foil blocking.

Explain **one** reason why hot foil blocking has been used for the lettering.

Hot foil blocking looks high quality and increases the perceived value of a product. This is suitable for a fancy wedding list which needs to be visually appealing and good quality. (2)



In this example the candidate has recognised that hot foil blocking looks high quality, that it gives increased perceived value and that it is more visually appealing.

Unfortunately the answer does not indicate **how** these points are achieved, for example linking the high quality to a metallic finish.

The response achieved one mark.

Question 6 (d)

Many candidates found this question to be challenging. The question asked for two different methods that could be used to bind the wedding guest book together.

Candidates tended to give two methods for binding the guest book, although in many cases some of these were not appropriate, such as ring binding or saddle stitching. Binding, perfect binding, staples and gluing were typical answers that did achieve marks.

Explanations were however often limited and did not an advantage of the use of the named processes.

(d) Give **two** different methods that could be used to join the completed front cover, pages and back cover of the wedding guest book together.

For each method, explain **one** advantage of using the method to join the front cover, pages and back cover of the wedding guest book together.

(6)

Method 1

stitch bonding

Explanation

very strong and presentable way of ensuring all of the pages are kept together. Long lasting / durable

Method 2

glue bonding

Explanation

does not damage the aesthetic of the wedding book however ensures everything is secure.

(Total for Question 6 = 16 marks)



This response was awarded four marks.

The candidate has given two appropriate methods.

For each method they have given a limited explanation of an advantage, for example recognising that stitch bonding (binding) is long lasting and that glue bonding ensures everything is secured.



When responding to questions similar to this, it is important that candidates state methods or processes that are appropriate to the context of the question.

Question 7 (a)

Candidates responded to this question with mixed success, which asked them to state the force in the given part of the mobile phone holder. A significant proportion of candidates did state compression or compressive force as an answer, although typical incorrect responses included gravity or tension.

Question 7 (b)

This part of the question asked candidates to explain two working properties of solid whiteboard that make it a suitable material for the mobile phone stand.

In their responses to this question candidates were able to give properties of solid whiteboard, such as rigidity, and link this to the context of the question. As with other questions where two explanations were required, many candidates included some repetition in their answers which limited their overall achievement.

(b) Explain **two** working properties of solid whiteboard that make it a suitable material for the mobile phone stand.

(4)

1. It's strong and rigid meaning it is able to hold the phone without collapsing.

2. It is a rigid board, meaning it does not move easily when the phone is being placed onto the holder and picked up, causing movement.



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In this example the candidate has been awarded 3 marks.

The first response was awarded one mark for reference to being able to support the phone without collapsing.

The second response was awarded two marks for reference to rigidity and reference to holding its shape.

Question 7 (c)

As with other mathematical questions on the examination, there were a number of common reasons why candidates did not achieve full marks when answering this particular question.

Conversions and rounding errors were generally the main reason, however a significant number of candidates calculated the area of a circle as opposed to a semi-circle.

Many candidates correctly determined the area of the rectangle/cuboid section even if they did not progress further and achieved some marks as a result.

(c) Calculate the volume of waste material produced when making the back rest.

Give your answer to the nearest whole cm^3 .

Use $\pi = 3.142$

$$g. \quad 3.142 \times 1.5 \text{ cm}^2 = 7.0695$$

(5)

$$7.0695 \div 2 = 3.53475$$

$$\cancel{100 \times 3} \quad \cancel{300} \quad 10 \times 3 = 30 \text{ cm}^2$$

$$30 + 3.53475 = 33.53475$$

$$33.53475 \times 0.4 = 13.4139$$

Answer 13 cm^3



The candidate has shown most stages of their working clearly, with the exception of the unit conversion which is indicated through the use of 1.5 and 10 as key values in the calculation.

Each stage has been written out in full, and intermediate values given that avoid excessive early rounding of values.

The answer has been stated to the required whole cm^3 .



When completing calculations, it is good practice to:

- show all working
- convert units at the start of the calculation
- avoid rounding until the final step of the calculation
- write the final answer on the answer line.

Candidates should also ensure they give their answer in the correct format, for example to the nearest cm^3 .

Question 7 (d)

This question proved to be challenging for many candidates. The question asked candidates to explain **two** reasons for fabricating the support part of the mobile phone stand from separate pieces of solid whiteboard rather than manufacturing it from a single piece. Only a limited number of candidates were able to provide two three-mark responses, however candidates often identified reasons and justified these with a short linked response. Typical answers included explanations that off-cuts could be used, or that waste is reduced.

The support part of the mobile phone stand could be fabricated from separate pieces of solid whiteboard rather than from a single piece.

(d) Explain **two** reasons for fabricating the support part of the mobile phone stand from separate pieces of solid whiteboard rather than manufacturing it from a single piece.

1. there could be less waste material ⁽⁶⁾ which would be beneficial as it would reduce costs as no longer paying for materials that aren't being used.

2. it could be more durable having separate pieces as the force will be applied separately for each piece so there's less chance of ~~so~~ snapping than a big piece and a physical join could replace a flimsy fold making it further durable.

(Total for Question 7 = 16 marks)



This response was awarded 3 marks.

In the first response 2 marks were awarded for identification of less waste and linked this to reduced need to buy new materials

In the second response the candidate has stated there is less chance of snapping since a physical join replaces a fold. This was awarded 1 mark.

Where candidates provided a linked response, provided the link is logical, they will often gain credit if points are from more than one marking point in the mark scheme.



When answering 3 mark explain questions candidates should structure there answer in such a way as to show the initial identification and the two expansions, for example:

it is this which means therefore

Question 8 (a)

In this question candidates were asked to explain one benefit of manufacturing a plant carrier from corrugated board. In many cases candidates recognised the benefits of corrugated board for packaging and the plant holder specifically. They recognised the material has impact resistance, however did not always relate this back to protecting the plant if the carrier was dropped or otherwise knocked in transit.

8 Figure 12 shows a plant carrier manufactured from corrugated board.

The plants are placed in compartments that are 100 mm × 100 mm.

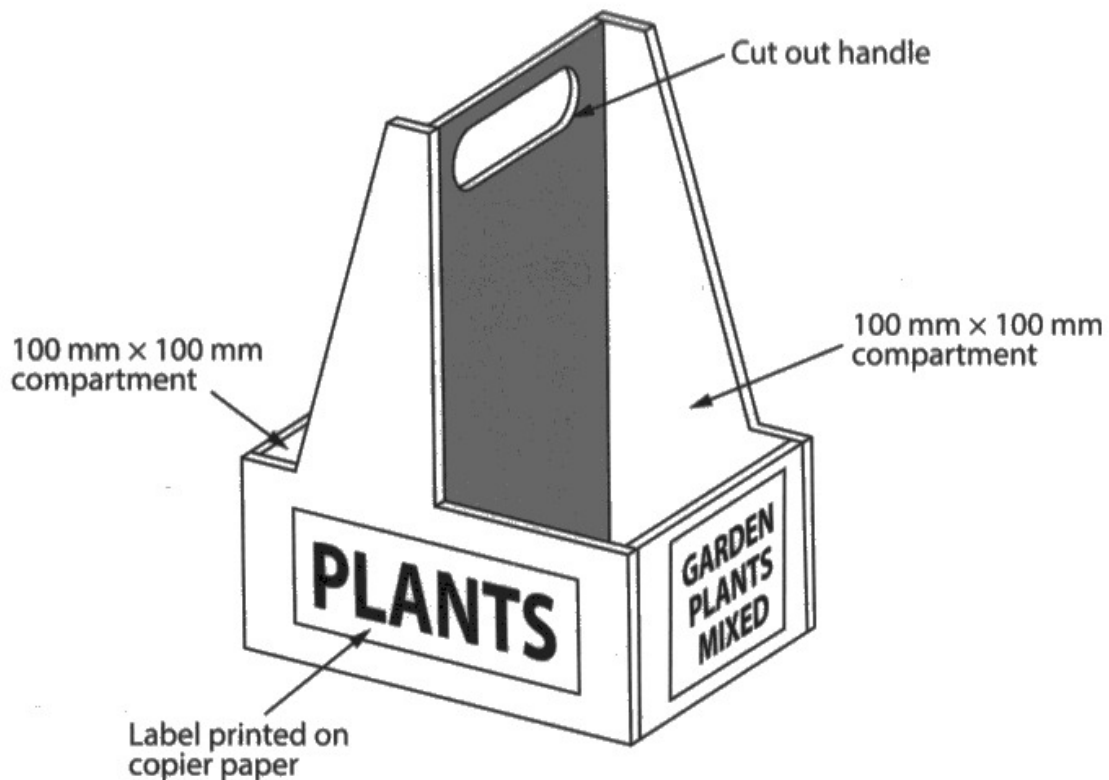


Figure 12

(a) Explain **one** benefit of manufacturing the plant carrier from corrugated board.

(2)

High strength to weight ratio. It is shock resistant and will keep the plants safe and intact when dropped.



This response was awarded 2 marks.

The candidate has recognised that corrugated board is shock resistant, and has linked this to protecting the plant when dropped.

Although brief, the answer is well structured and relates clearly to the context of the question.

Question 8 (b)

In this question candidates were asked to explain one advantage of carrying out a quality control check on the plant carriers during manufacture. The question required an answer to be given that related directly to the plant carrier, for example related to dimensional tolerances. Many candidates gave generic responses that simply stated 'check for errors' which achieved no marks. Where candidates did score marks they referenced being able to hold the weight of the plants, or the plants fitting inside them. Some candidates also considered quality of printing which was appropriate given the printed label.

The plant carriers are subjected to quality control checks during manufacture.

(b) Explain **one** advantage of carrying out a quality control check on the plant carriers during manufacture.

(3)

This prevents the release of defective plant carriers which may be the wrong size and will therefore not fit the plants they are meant to carry.



The candidate has been awarded 2 marks.

The candidate has recognised it would prevent the release of carriers that are the wrong size and linked this to plants not fitting.

There is no reference to changing tooling or similar, therefore the third mark cannot be awarded.

Question 8 (c)

This question asked candidates to explain two reasons why printing would be used to manufacture the labels for the plant carriers. Many candidates were able to achieve some marks for this question, for example making reference to lead times, batch production, the ability to print on different materials or ability to change the label.

A minority of candidates responded with respect to printing being better than handwriting labels, however this was not an appropriate comparison for a batch of plant carriers.

(c) Explain **two** reasons why printing would be used to manufacture the labels for the plant carriers. *unseen up.*

(4)

1. It's a versatile process and so can be used on a variety of materials for example, paper, ~~boards~~ boards and fabrics
2. It's fast and efficient so a large number of labels can be produced in a small amount of time.



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This candidate has been awarded 3 marks.

In response 1 they have recognised that printing is versatile process and has linked this to being able to use a variety of materials for 2 marks.

In response 2 there is recognition of short lead times which can be awarded 1 mark.



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Examiner Tip

Avoid generic terms such as faster or cheaper as single word responses.

Question 8 (d)

This was the final question on the exam paper in which candidates were provided with some information about the materials used in the plant carrier, the target market and scales of production.

The question asked candidates to evaluate the plant carrier with reference to social and availability factors including:

- use for different social groups
- use of stock materials
- use of specialist materials

Candidates responded with varied success. They often considered sustainability generically and thus achieved band one marks. Where candidates drew together a range of factors such as transportation from source to manufacturing, changes in demand and the use of stock materials from various suppliers, they tended to achieve marks in the higher mark bands.

It is important when writing extended responses to these questions that candidates consider the information in the question, the factors that are to be evaluated, and apply their knowledge and understanding of design and technology to provide a balanced evaluation.

- (d) The plant carrier is manufactured from corrugated board and has labels that are printed on copier paper that are then applied to its surfaces.

Figure 13 shows some additional information about the plant carrier.

Source of copier paper	China
Plant carrier material	Stock sized 3 mm corrugated board
Potential market	Garden centres, supermarkets
Scale of production	Batch

Figure 13

Analyse the information in Figure 13.

Evaluate the plant carrier with reference to social and availability factors including:

- use for different social groups
- use of stock materials
- use of specialist materials.

(9)

The plant carrier's use for ~~its potential market~~ ^{social groups could be} mixed. The target market of garden centres may like the product as it is made from corrugated board and not plastic. This makes it environmentally friendly. However, shipping it from China is a long distance which will ~~make~~ increase costs and add air pollution from transportation.

Supermarkets may find that the product not very durable due to it being made out of corrugated board only 3 mm thin. With lots of ~~the~~ customers, it is likely to be destroyed quite quickly which will mean it has to be replaced quite frequently.

The use of stock materials increases the availability of the product which is useful to supermarkets who have a

large customer base. This is also useful to garden centres as the ~~plants~~ ^{plants} they hold are likely ~~one of~~ the main products sold. However, if there is a specialised product that is bigger or much smaller, it will not be able to fit in the carrier. Batch production could be seen as useful as it allows for the ~~product~~ carriers to arrive after the last set of plants died or was sold. However, if it is not produced ~~at~~ as the plants are sold, the potential market will have nowhere to put the new supply of plants.

There is little use of specialist materials in the product. This ~~may make~~ ^{may make} it less aesthetically appealing as it will be view by the potential market as 'boring'. However, lack of specialist materials could be attractive as it would likely be cheaper. Batch production allows for an increased use of specialist materials in the future. Specialists ^{appeal to a niche market!} materials could also make it only.

In evaluating the plant carrier, it is quite socially acceptable due to it being quite a generic product that is relatively inexpensive for the potential market. It is also quite available to the market due to stock sizes although it has to be shipped from China and ^{you have to} wait for each batch. There are ~~a range~~ ^{a range} of positives and negatives to the product.

(Total for Question 8 = 18 marks)

TOTAL FOR SECTION B = 60 MARKS
TOTAL FOR PAPER = 100 MARKS



This response was awarded a level three mark.

In their answer the candidate has demonstrated the three required traits to achieve a level three mark.

- Interrogation and deconstruction of information to provide sustained connections and logical chains of reasoning.
- A well-balanced appraisal of the information/issues, containing judgements that show a thorough awareness of the interrelationships between factors or competing arguments.
- A conclusion that is fully supported by relevant judgements.

They have recognised that the product might not be suitable for products of different sizes, and that batch production is suitable as it allows for new batches to be produced when needed.

The conclusion draws together relevant points such as the carrier being a generic product that is appropriate for the target market.

Paper Summary

Overall the paper provided questions that gave candidates the opportunities to demonstrate their knowledge of Design and Technology via a range different context based questions, including several maths based questions but in a DT context. The paper offered a range of differentiated questions that candidates could answer in differing degrees and a full range of marks were observed across the whole cohort.

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>

