



Examiners' Report

June 2022

GCSE Design and Technology 1DT0 1F

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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 feeder from one location to another. Many candidates identified how the feeder could be hung on a hook, but not how it could be easily moved elsewhere.

Similarly candidates did not always explain how the jar could be easily replaced, they simply showed a method of holding in place securely.

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.

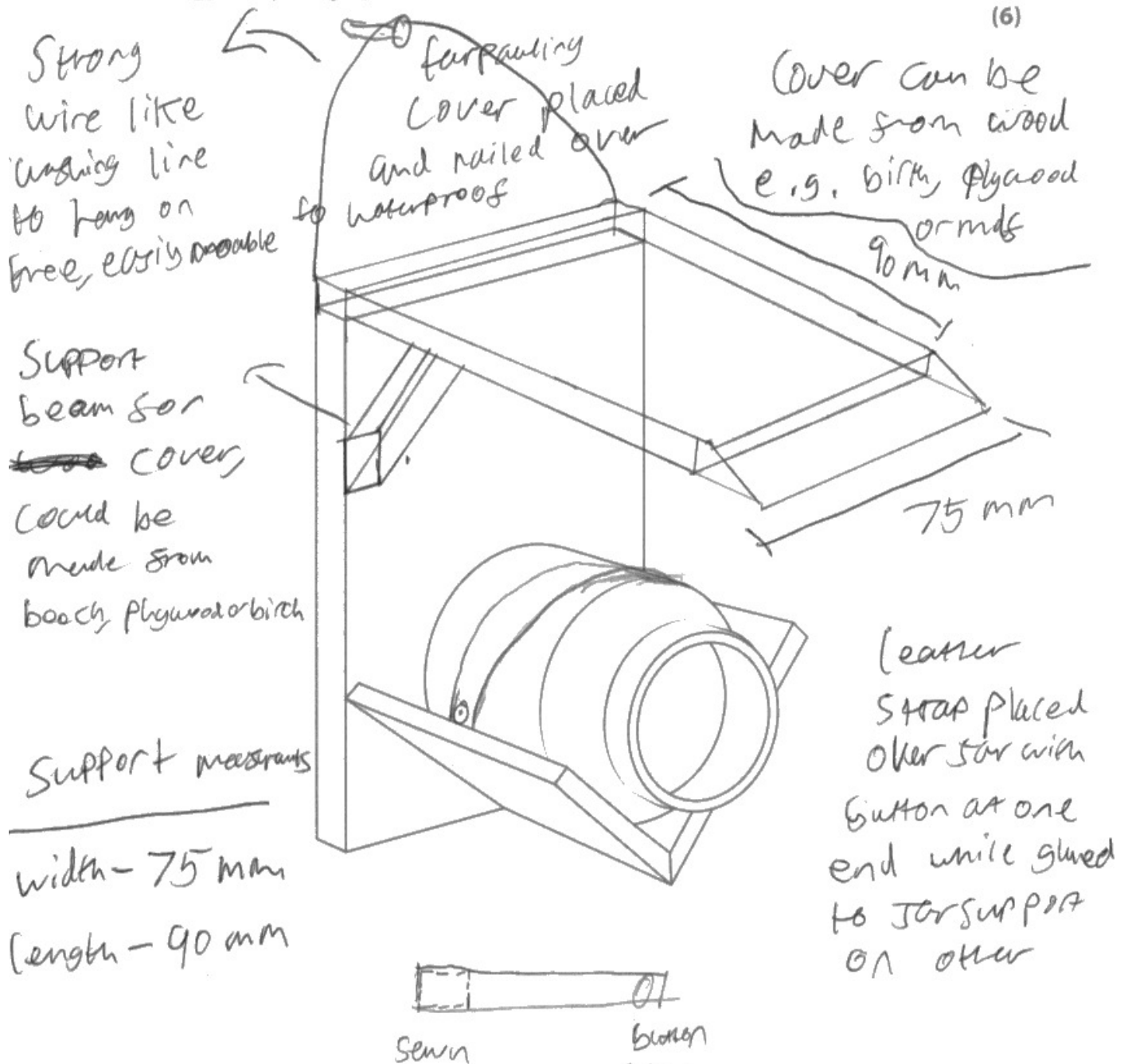
(a) The bird feeder holds a full jar of peanut butter and needs to be improved to include the following specification points.

The bird feeder must:

- hold the jar securely and allow an empty jar to be easily replaced
- include a cover that protects the backboard and jar support and keeps the jar dry
- be able to be hung up in a tree and easily moved to another tree.

Use notes and sketches, on the outline below, to show how the bird feeder 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 the modified design there is evidence of:

- how the jar is held securely with the strap that goes over the top of the jar
- a cover that protects the back board and keeps it dry since it covers the whole width of the back board
- a cover that extends the front edge of the jar
- a method to hang the feeder in a tree

The annotations explain how these points have been met.

Where marks have not been awarded there was insufficient evidence, graphically or using the written word to say how the jar was to be replaced such as 'the strap could be undone allowing the empty jar to be pulled out and a new one put back in its place' or how the feeder was to be moved from one tree to another such as 'the feeder is unhooked from one tree and the hoop is hung over another branch or nail in a new tree'.



Candidates should make sure that their sketches and annotations indicate how both parts of the specification points are met, its not sufficient to simply say 'and easily replaced' without any explanation or annotation as to how.

Question 5 (b)

This is another familiar type of question whereby candidates are required to explain reasons how the money box in this case, meets or fails to meet a given criterion.

Candidates tended to respond well when answering this question scoring marks for at least one of the two required explanations.

The tea-cup shaped money box allowed candidates of all levels to provide some analysis of the good or poor aspects of the design.

The information provided in the question related to the transparent screen which was labelled and the question was about how the product could provide a method to encourage young children to save money.

(b) Figure 7 shows a wooden money box in the shape of a tea cup.

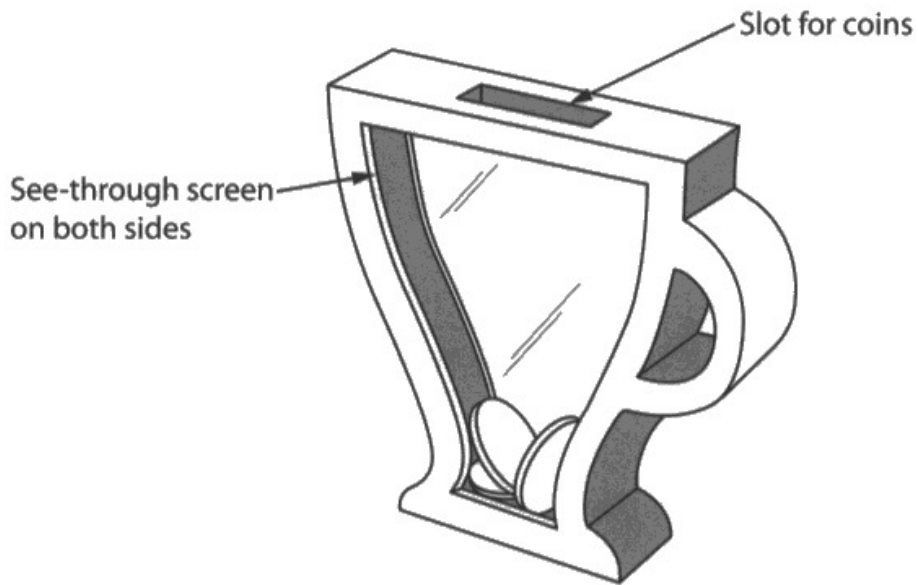


Figure 7

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

(4)

1. IT'S thin so wont be able to fit alot of money in it and doesn't look very ^{balanced} ~~stable~~ so ~~you~~ might fall and break

2. IT'S got a see-through screen so can see how much you have got in it.

(Total for Question 5 = 10 marks)



The most common issue on this question related to candidates repeating the information that had been given in the question in that they were suggesting that the see through screen allowed the young children to see how much money they had saved which would encourage them to save. In effect this type of response would only be scoring 1 mark.

This response scored 3 marks, two marks for the first response and 1 mark for the second response for being able to see how much money was inside.



They are no marks for repeating any of the information in the question.

It is appropriate when answering this question to give two explanations as to how the product meets the requirements, fails to meet the requirements or one explanation for each.

Question 6 (a)

The focus of the question was on the use of stock sized materials for the children's painting easel.

A significant proportion of candidates concentrated their answers on the material itself, MDF by giving properties and characteristics, as opposed to the standard sized sheets. Therefore answers relating to the smooth nature of MDF scored no marks.

Where candidates responded appropriately with answers relating to less cutting or being more readily available, they were rewarded with marks.

Question 6 (b)

Many candidates found this particular question to be very challenging and did not respond with answers linked to the cutting of the rebate for the hinge. In many responses candidates provided detailed notes about how to mark it out as opposed to cutting out the rebate itself.

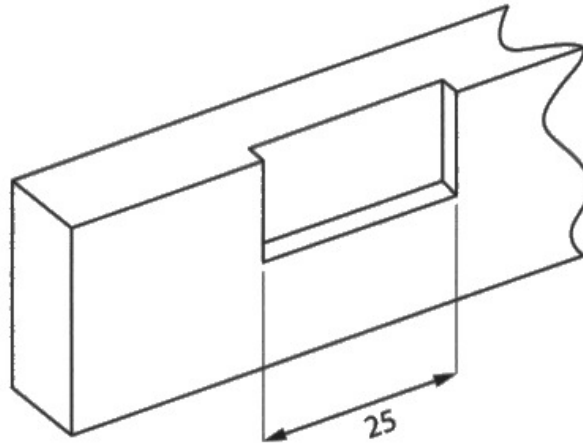
Often candidates achieved a single marks for reference to the use of a chisel only.

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

A question format that has been used before whereby candidates are asked to use notes and sketches to show how something needs to be done.

Many candidates thought that the rebate could be cut out with a coping or hacksaw and then it could be filed flat.

(b) Figure 9 shows a rebate on the inside of the top rail of the frame where a 25 mm butt hinge is fixed.



All dimensions in mm

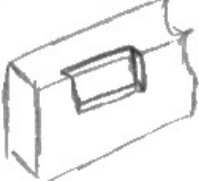
Diagram not to scale

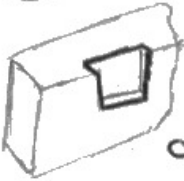
Figure 9


Use notes and sketches, in the space below, to show how the rebate for the hinge would be cut using hand tools.

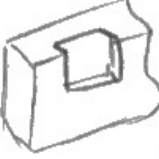
You will be marked on how you apply your understanding of design and technology, not your graphical skills.

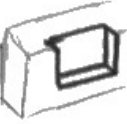
(4)


①  First mark out the area needed to be cut. Use a tri-square for straight lines and mark with a pencil.

②  Cut the lines on the outside part of the outlined shape with a tenon saw.

③  Using a ~~erase~~ chisel, and a mallet, chisel your way down until you think its enough at the bottom.

④  ~~Use~~ still using a chisel and mallet, chisel the bottom and sides until the shape ~~peeps~~ pops out.

⑤  Carry on chiselling it until it is smooth and straight.



tenon saw
chisel
mallet
trisquare
pencil.



This candidate has produced some very neat little sketches to show the process and although they have also included the marking out stages, they have still been able to score 3 marks for a range of chiselling processes such as cutting down to a depth, across the grain and then to smooth it to a finish.



Make sure you use notes and sketches as one alone will restrict your ability to access the whole range of marks available.

Question 6 (c)

Candidates generally responded well to this part question which asked them to explain one reason for applying a varnish finish to the frame of the childrens painting easel.

In many instances one mark was awarded for reference to the varnish being able to provide some form of protection to the wooden frame.

Linked responses were also relatively common with the most common form of response being related to the reduced risk of surface splintering.

(c) The frame of the children's easel has been finished with varnish.

Explain **one** reason why varnish has been applied to the frame of the children's easel.

(2)

It allows the wood to be protected from paint as it can easily be wiped off a varnished surface



ResultsPlus
Examiner Comments

An explain type of question such as this one requires reason for applying varnish and a linked justification for that reason.



ResultsPlus
Examiner Tip

This is a super example of an accurate, concise response for two marks: a form of protection from paint that means the paint can be easily wiped off.

Question 6 (d)

Many candidates found this question to be challenging. The question asked for two different methods that could be used to join the bottom rail to the upright on the children's painting easel.

Candidates tended to give two correct methods for joining the frame such as a dowel joint and mortise and tenon however they were not always able to give an advantage of the named joint and a linked justification, rather explanations tended to be a description of the joint.

This type of response requires a type of joint for 1 mark accompanied by an advantage of the named joint and a linked justification for its use.

- (d) Give **two** different wood joints that could be used to join the bottom rail and an upright on the easel.

For each wood joint, explain **one** advantage of using the wood joint to join the bottom rail and an upright on the easel.

(6)

Joint 1

mortise and tenon

Explanation

creates a high surface area friction fit which won't be seen ~~from~~ outside so creates a good, sturdy, appealing finish

Joint 2

lap

Explanation

again gives high surface area and allows space for adhesive to create a long lasting joint



This response scored 4 marks; two marks for each response. The type of joint named in each instance is worthy of 1 mark each and the advantage, although the same for each response, is valid in this context in that both types of joint increase the gluing area. Had the candidate gone on to justify the advantage of the increased gluing area, they would have scored the third and final mark for each individual response.



Make sure you look at how many marks are available for any single part question ensuring that you give the appropriate number of points in response.

Question 7 (a)

Candidates responded to this question with mixed success. They were asked to state the force in the top part of the flower vase.

A good proportion of candidates gave compression or compressive force as the correct 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 ash in the context of the flower vase.

In their responses to this question candidates were able to give properties of ash such as its flexibility or elasticity and its good resistance to water.

As with other questions where two explanations were required, many candidates included some repetition in their answers which limited their overall achievement.

As noted above, where two explanations are required, each one should be distinct and different.

(b) Explain **two** working properties of ash that make it an ideal material for the flower vase.

1. ASH IS FLEXIBLE. THIS MEANS IT CAN BEND OR DEFORM WITHOUT SPLINTERING WHICH IT NEEDS TO DO. (4)
2. ASH ALSO HAS HIGH COMPRESSIVE STRENGTH, THIS MEANS THAT IT CAN WITHSTAND BEING COMPRESSED AS THE TOP PART NEEDS TO.



This is an excellent example of two very different properties of ash, both of which have an appropriate linked justification.



When providing responses to questions such as this start by giving a working property of ash and use then a connective such as 'which means' or 'therefore'. This means you will continue to write on, providing a linked justification of that property. However, do make sure the property is relevant and related to the context of the product, in this instance a flower vase. The vase is going to be subjected to compressive forces, some bending and potentially the risk of getting wet.

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 main body.

Give your answer to the nearest whole cm^3 .

Use $\pi = 3.142$

(5)

$$\cancel{100 \times 30 = 3000 \text{ mm}^2}$$

$$10 \times 3 = 30 \text{ cm}^2$$

$$\frac{1}{2} \pi 1.5^2 = 3.53429... \text{ cm}^2$$

$$SA = 33.53429...$$

$$33.53 \times 20 = 670.68$$

Answer 671 cm^3



This example has scored 4 marks and it is really important to recognise that even though the final answer is wrong, they have still scored 4 of the 5 marks available and that is because they have shown all their working out. If the final answer is wrong, you can still gain credit for parts that are correct.



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 .

- (c) Calculate the volume of waste material produced when making the main body.
Give your answer to the nearest whole cm^3 .

Use $\pi = 3.142$

(5)

~~$20 \times 100 = 2000$~~

$$15 \times 2 = 30 \text{ mm} = 3 \text{ cm}$$

$$30 \times 100 = 3000 \text{ mm}^2 = 30 \text{ cm}^2$$

$$3000 \times 20 = 60,000 \text{ mm}^3 = 60 \text{ cm}^3$$

$$30 \text{ mm} = 3 \text{ cm}$$

$$3 \times 10 \text{ cm} = 30 \text{ cm}^2$$

$$30 \text{ cm}^2 \times 2 \text{ cm} = 60 \text{ cm}^3$$

$$\pi \times R^2 = \pi \times 1.5^2 = 2.25\pi = 7.0695 \text{ cm}^2$$

$$\frac{7.0695}{2} = 3.53475 \text{ cm}^2$$

$$3.53475 \times 2 \text{ cm} = 7.0695 \text{ cm}^3$$

$$60 \text{ cm}^3 + 7.0695 \text{ cm}^3 = 67.0695 \text{ cm}^3$$

$$= 67 \text{ cm}^3$$

Answer 67 cm^3



ResultsPlus
Examiner Comments

This is a really well laid out response where the candidate has shown their working out and at each stage an answer has been given which makes it very easy to follow and their final answer has been written in the answer space provided.



ResultsPlus
Examiner Tip

Make sure you show your working out and answer at every step of the process in any maths based question.

Question 7 (d)

This question proved to be very challenging for many candidates. The question asked candidates to explain two reasons for fabricating the main body of the flower vase from separate pieces of ash rather than manufacturing it from a single piece.

Candidates often identified reasons and justified these with a short linked response, typically related to the fact that there would be less waste produced so that the main body could be made up from smaller sections of ash.

The main body of the flower vase could be fabricated from separate pieces of ash rather than from a single piece.

(d) Explain **two** reasons for fabricating the main body of the flower vase from separate pieces of ash rather than manufacturing it from a single piece.

1 Less wasted material because each ^{separate} piece (6) can be ~~each~~ to a small section, which needs less cutting and manufacturing so less is wasted and it is more efficient and environmentally friendly.

2 Cheaper to buy separate pieces as less overall ash is bought and more is used and less is wasted so it is cost-effective.



ResultsPlus
Examiner Comments

This response scores 4 marks, 2 marks for each of the two responses with the two most common sets of responses seen.



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

Less waste will be produced which means therefore

Question 8 (a)

In this question candidates were asked to explain one benefit of manufacturing the dinner tray from plywood.

In many cases candidates answered with generic type responses or with responses about plywood being manufactured from scrap bits of wood.

Some recognised the benefits of using plywood in relation to its availability of larger, flat sheets.

Question 8 (b)

In this question candidates were asked to explain one advantage of carrying out a quality control check on the dinner tray during manufacture.

The question required an answer to be given that related directly to the dinner tray, for example related to dimensional tolerances, rather than the more generic type responses that simply stated 'check for errors' which achieved no marks.

Where candidates scored marks they referenced being able to check for the correct dimensions or about the safety aspects and how they could result in returns and complaints from customers.

The dinner trays are subjected to quality control checks during manufacture.

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

(3)

check that there are no hazards or splinters sticking out and that forks and knives fit into the holes before dispatching so no products are sent back and company get bad reputation.



ResultsPlus
Examiner Comments

The candidate has given a number of advantages but only one can be credited. In this instance the first mark was for the size of the holes for the knives and forks and the issues related to this if they were not big enough in that products would be returned to the manufacturer.



ResultsPlus
Examiner Tip

Make sure you know how many marks are available for each question type so that you know how to structure your response, giving yourself the best possible chance to score all the marks available.

Question 8 (c)

This question asked candidates to explain two reasons for using a router to manufacture the dinner tray.

Many candidates were able to achieve some marks for this question, for example making reference to the ability to be able to cut to set depth, for making identical copies of the tray or that routers could be controlled by computers.

(c) Explain **two** reasons for using a router to manufacture the dinner trays.

(4)

- 1 A router is quicker and easier to use than a saw, which would not get perfectly round cuts. It can be moved around a jig for a perfectly round cut and will minimise ~~cut~~ mistakes. The rotary cutter means it can create curves.
- 2 The height of the cutter can be set, so the 9mm slots can be cut quickly and efficiently, with the help of a jig to guide it, rather than drilling holes or using chisels and a saw and then having to waste more off by sanding. So a router means it is quicker and reduces waste. It doesn't ~~have to~~ cut all the way through, if that is desired.



ResultsPlus
Examiner Comments

This response scored 3 marks, 1 mark for the first response in the answer that refers to the process being quick. Quick alone would not be sufficient for a mark but given the comparative element, credit of 1 mark was worthy. The second response is worthy of 2 marks for the linked point about the ability to be able to set the height to 9mm, plunge to a depth, and how this allows for the slots to be cut.

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 dinner tray is manufactured from plywood and has an oak veneer applied to its surface.

Figure 13 shows some additional information about the dinner tray.

Source of oak veneer	European forests
Dinner tray material	Stock sized 18 mm plywood sheet
Potential market	Hospitals, care homes and restaurants
Scale of production	Batch

Figure 13

Analyse the information in Figure 13.

Evaluate the dinner tray with reference to social and availability factors including:

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

(9)

The source of the oak veneer will begin to pick up problems as oak is a hardwood which can take 20-30 years to mature meaning it cannot be cut until this time reducing availability and creating potential issues of deforestation, or extinction of these trees, so the product will need to change the veneer due to cost and availability.

The use of stock sized materials is a wise choice as you can buy in bulk to reduce cost and waste material reducing the cost to buy and produce increasing potential.

profit allowing the product to pay for itself. However as the product is batch produced it will need to be control checked when leaving the production line to ensure there is no damage and the product is to a certain standard.

Also this product aims to sell to hospitals but these trays are made of wood meaning they will have a higher mass making it hard for staff to transport and give out. There are also problems with the veneer and plywood used. The mass amount of cleaning and use could cause the material to rot and warp making it unsafe for a hospital environment.



ResultsPlus
Examiner Comments

This response covers a range of points that have been asked to be considered and the candidate provides a well structured response that is worthy of a top mark in the Level 2 band. Had they been able to go on and provide more detail they would have been able to access the range of marks available in the Level 3 band.



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.

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>

