



# **Examiners' Report**

## **June 2022**

**GCSE Design and Technology 1DT0 1C**

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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)**

It was encouraging to see candidates annotating their response and ticking off the specification points once they had met them on the drawing. Most candidates were able to get three marks for getting the first point of each specification point. Many candidates failed to cover the backboard with a shelter, or demonstrated an easy way to release the jar. Many candidates just provided a hole for hanging on a tree but no real explanation of how it could be moved to another tree. A number of candidates had a cover for the jar that was difficult to tell if it would actually protect it from the elements.

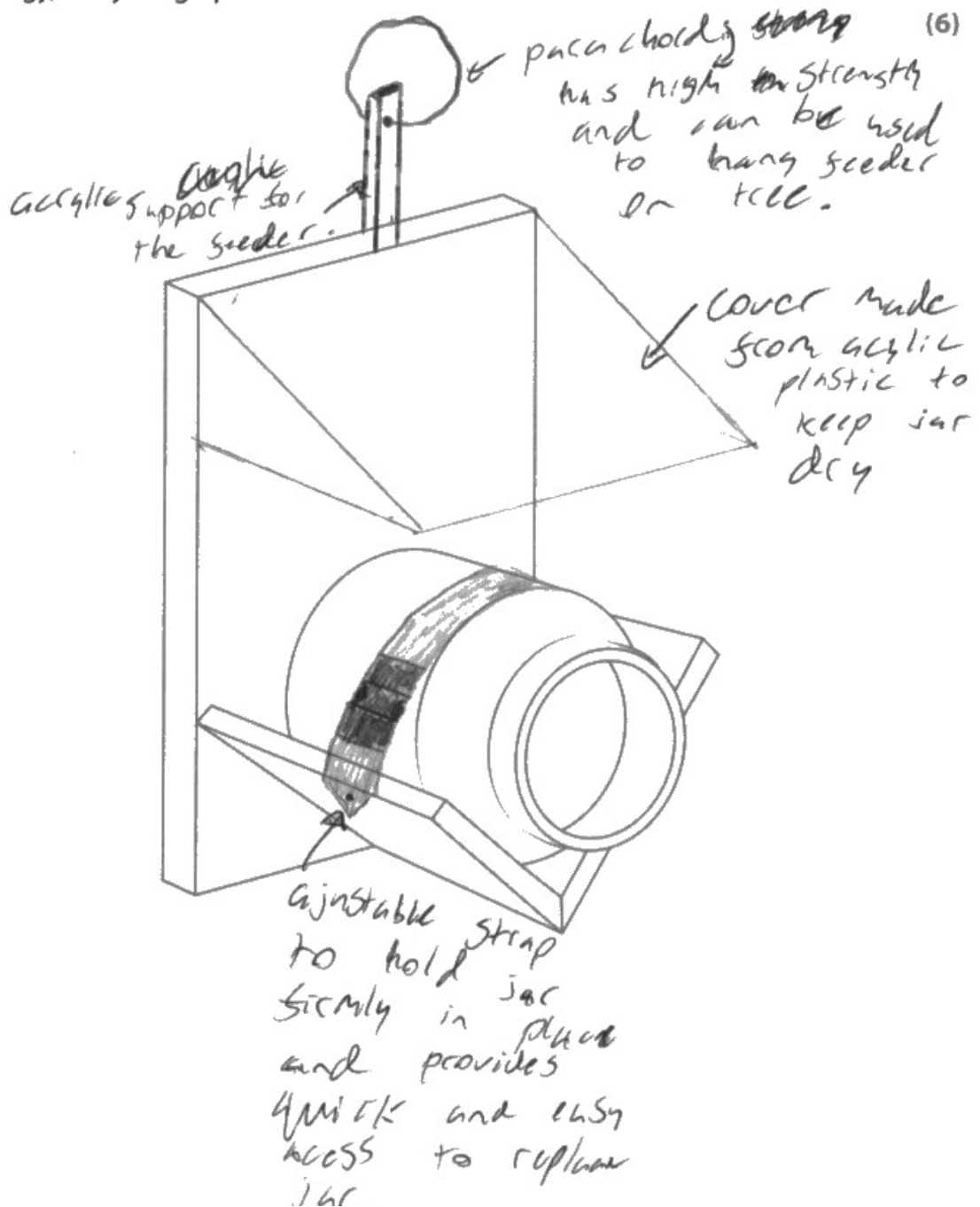
(a) The bird feeder holds a full jar of peanut butter and needs to be improved to include the following specification points.

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.





This response has scored full marks for both the first two sets of bullet points and only 1 mark for the final set of points since there is no annotation to say how the feeder could be removed from one tree and hung or placed in another tree.



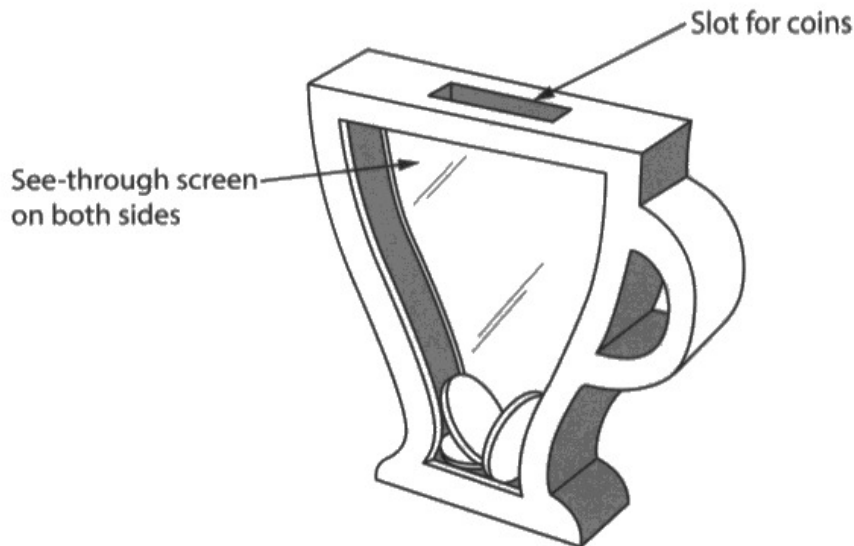
Candidates would benefit from adding dimensional detail to their drawings to show that it was longer/wider than the jar to give that protection.



## Question 5 (b)

Many of the candidates did not really answer the question and just repeated the words from the question such as 'provides a method to encourage children to save' but with no real reason. Those that scored well here talked about the inappropriate shape/design of a tea cup as it was not attractive to the user. There was reference to the object being transparent allowing children to see how much they had saved giving access to one mark.

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



**Figure 7**

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

(4)

1. Able to see-through the screen, allows the child to see how far they have to go, to meet their goals, or fill the money box.

2. The shape of the money box seems narrow, meaning there may not be enough space to collect enough money.



This response scores the full 4 marks available for two concise responses related to seeing how much money they have saved and about how small it is.

## **Question 6 (a)**

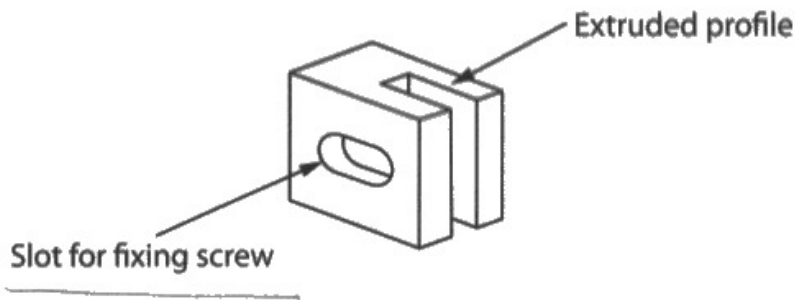
The majority of candidates were able to score at least two marks here for either a linked response being the front panel being made to match the size of a standard sheet therefore less waste material or two low responses such as readily available material or less cutting required. Common incorrect responses focused on the property of the acrylic sheet such as it being lightweight and easy to move or available in a range of colours.

## **Question 6 (b)**

This question was well answered by most candidates having drawn some sort of drill and described it appropriately and many candidates discussing how to take a coping saw blade out and placing it in the hole to cut the shape out.

A large majority of candidates discussed using a hand file to shape and finish the slot.

(b) Figure 9 shows one of the brackets manufactured from an extruded profile of polyvinyl chloride (PVC).



**Figure 9**

Use notes and sketches, in the space below, to show how the slot for the fixing screw would be created on both sides of the PVC bracket using hand tools.

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

(4)

the shape of the slot should be marked out onto both sides of the PVC

Using a hand drill, the PVC should be clamped to the table and a single hole should be drilled in the centre of the block.

The whole allows for a coping saw to be inserted ~~for~~ <sup>unscrewing</sup> the blade & inserting through before reattaching.

vice - won't move

The coping saw can then be used to cut out the slot using a linear motion, following the guide.

→ repeat for other side



This is an excellent example of a response scoring full marks from a candidate who has a clear understanding of the nature of the task and they have explained how to cut the slot using a range of tools and processes.



Make sure you answer this type of question with a combination of notes and sketches.

### **Question 6 (c)**

The majority of candidates did not respond well to this question. The focus was about the laser being accurate/reduced human error and therefore producing high quality products. Those that scored well centred their responses around the laser machine producing permanent lettering as opposed to vinyl stickers peeling off.

### **Question 6 (d)**

Many candidates had an in depth understanding on different fixings that can be used for acrylic but often failed to correctly justify their responses, for example a large majority of candidates identified tensol cement as an adhesive but failed to justify this as it dries clear so it can be used for aesthetic purposes. Overall candidates responded reasonably well but needed better justification to get 5 and 6 marks. A noticeable number of candidates did not attempt this question.

### **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)**

Candidates had a reasonable attempt at this question. Where success was gained, it saw candidates talking about the materials flexibility or elasticity to create the shape of the vase or its optical clarity making it visually appealing. Incorrect responses centred around the vase being see through which meant you could tell when the water needed to be changed or could view the plant from all sides.

### **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  $\text{cm}^3$ .

Use  $\pi = 3.142$

(5)

$$100 \times 30 = 3000 \text{ cm}^2 \quad \square$$
$$3000 \text{ cm}^2 \times 20 = 60,000 \text{ cm}^3 \quad \text{box}$$

$$\pi \times 15^2 = 225\pi \quad \cup$$

$$\div 2 = 353.4291735 \quad \left| \frac{225}{2} \pi$$

$$\times 20 = 2250\pi \text{ cm}^3 \quad \text{cup}$$

$$60,000 + 2250\pi$$

$$= 67068.58347$$

$$= 67069 \text{ cm}^3$$

Answer 67069  $\text{cm}^3$



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  $\text{cm}^3$ .



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  $\text{cm}^3$ .



### **Question 7 (d)**

Candidates struggled to answer this question to gain full marks as most identified that the single piece would create less waste and therefore limiting the impact on the environment. Common incorrect responses talked about the material being easier to transport or increasing the speed of production.

### **Question 8 (a)**

The majority of the candidates were able to successfully offer a linked response that mainly focused on the material being an insulator of heat therefore keeping the food warm for longer. The occasional incorrect response talked about the material being cheap to manufacture or lightweight.

### **Question 8 (b)**

Many of the candidates were not able to respond correctly to this question.

Answers were simply too generic and just centred around products being manufactured without flaws with no specific problems stated such as holes or incorrect dimensions for example.

### **Question 8 (c)**

Candidates failed to respond well to this question which is slightly surprising as it is a common process. Some candidates misinterpreted the question and gave a description of the process. Learners that scored well talked about the single mould being used and the ability to repeat production of identical trays.

## 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 food container the target market and scales of production.

The question asked candidates to evaluate the food container 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 takeaway food container is manufactured from PET.

Figure 13 shows some additional information about the takeaway food container.

Source of oil for PET	UAE
Takeaway food container material	Stock sized 1.5 mm sheet
Potential market	Takeaway food shops, hospitals and school canteens
Scale of production	Continuous

Figure 13

Analyse the information in Figure 13.

Evaluate the takeaway food container with reference to social and availability factors including:

- use for different social groups
- use of specialist material
- effect of global oil supply.

(9)

The takeaway container is a ~~great~~ very good as it is not offensive so no social groups will find it offensive. It is also not specific to any type of takeaway shop meaning that different takeaway shops like Chinese and Indian takeaway restaurants can make use of it meaning it is ~~not~~ diverse and inclusive. One issue is that activist social groups may not be happy with the containers as they are disposable and aren't very environmentally friendly as they are made from plastic which has to be refined from oil which releases harmful gasses into the air and many people won't try to recycle them and therefore they are likely to end up in landfills. Another issue regarding the material is that it is sourced only from the UAE meaning that it isn't local and won't support local business and it is also

very harmful for the environment because it has to be shipped from so far away meaning the carbon ~~foot~~ emissions from transportation ~~system~~ will be very high. Overall the product has a very bad eco-cycle as throughout its harvesting of the crude oil, refinement, manufacturing process, life, ~~and~~ disposal, transportation and electricity used at all the relevant steps ~~it~~ it is ~~now~~ releasing a lot of harmful gasses and ending in landfills.

Another issue with this product is that it will have a very negative impact on the global oil supply as the scale of production is continuous to keep up with consumer demand. The reason this is bad is because oil ~~will~~ will have to be continuously ~~harvested~~ drilled and refined which uses up a lot of the world's oil supply. Another way in which it has a negative effect on the world's oil supply is that the ~~long~~ long transportation ~~require~~ requires ~~the~~ oil in the form of petrol to transport it using up a lot more oil. As so much oil will be used up it will only drive the prices of oil much higher making it more difficult for people to get a hold of



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>

