

# Design and Technology Product Design

Answers and commentaries  
A-level (7552)

## **Paper 1: Technical principles**

Marked answers from students for questions from the June 2022 exams. Supporting commentary is provided to help you understand how marks are awarded and how students can improve performance.

# Contents

The below content table is interactive. You can click on the title of the question to go directly to that page.

<a href="#">4 mark question (short response)</a>	3
<a href="#">6 mark question (extended response)</a>	6
<a href="#">7 mark question (Maths skills)</a>	10
<a href="#">9 mark question (extended response)</a>	15
<a href="#">12 mark question (extended analysis and evaluate)</a>	20

# Answers and commentaries

This resource is to be used alongside the A-level Design and Technology: Product Design June 2022 Question paper 1 Technical principles.

## 4 mark question

Short response

### Question 19

Describe **two** ways that a jig could be used to improve accuracy in manufacture.

**[2 x 2 marks]**

### Mark scheme

AO4 1b (2 × 2 marks)

**One mark** for a simple statement relating to the use of a jig.

**Two marks** for a detailed description that clearly explains how accuracy can be improved.

#### Indicative content

- A jig improves accuracy by removing the need for measuring and marking out to take place each time a cut is made or a hole drilled. This removes the potential for human error throughout the marking out process.
- A jig can improve the accuracy of manufacturing a particular joint, by securely holding the workpiece while also guiding the cutting tool, eg when cutting a mitre joint in timber or when drilling a hole.
- A jig can be used to ensure consistency when manufacturing a product, eg guiding a router around a particular profile ensuring consistency and accuracy where two kitchen worksurfaces may join.

**This list is not exhaustive. Accept any other valid responses.**

## Student responses

### Response A

- 1 A jig is used to hold a material in an exact position/clamp it down whilst being worked on. This means that the material stays in the exact required position, and will not move, which could, if not carried out correctly, lead to faulty products.
- 2 A jig is also used to guide tools into exactly the right designated location in the material. This reduces the risk of a hole being drilled in the wrong place, or too many holes being drilled, leading to more finished and accurate outcomes.

In this response the student provides two detailed responses accessing maximum marks.

In the first point they mention that the work would be clamped and held. They go on to explain that if this did not happen the work would move and lead to a faulty product.

In the second point they mention that a jig is used to guide a tool to a designated location. They go on to add clarity to this by identifying the drilling process and linking it to continued accuracy in manufacture.

**4 marks**

Response B

- 1 Products are made to the same dimensions every time.
- 2 It takes out the human error factor which massively reduces the chance of error.

In this response the student provides two different, appropriate ways in which a jig may improve accuracy, but in both cases the statements are simple and lack any explanation or justification. Therefore, the student receives 1 mark for each point made.

**2 marks**

## 6 mark question

Extended response

### Question 22

Outline how and why a company would use social media to market their product.

[6 marks]

### Mark scheme

AO4 1b

Marks	Description
5–6 marks	The response shows a detailed understanding of how and why social media would be used by a company to market their product. The response may refer to the area of marketing, the interaction with the consumer and the beneficial impact on the company.
3–4 marks	The response demonstrates some understanding of how and why social media would be used by a company to market their product and some awareness of the methods used or the benefits to the company.
1–2 marks	The response offers a basic understanding of how social media would be used by a company to market their product.
0 marks	No response or nothing worthy of credit.

### Indicative content

- Social media can allow a company a **worldwide platform** on which to market their product. This in turn can lead to **increased sales**, exports and the appointment of regional or national distributors.
- Social media is **more cost effective than the traditional costs** associated with advertising or distribution of marketing material. Costs are passed on to the consumer through internet subscription or data plans.
- Advertising **campaigns can be pushed out daily** due to the digital nature of the advert and the relative ease in which a graphical communication can be produced.
- Potential customers can be alerted to a brand via **linking techniques such as 'hashtags'** providing the company with increased coverage and associating them with similar companies.
- **User reviews or recommendations can be instantly shared** online through ancillary platforms such as 'Trustpilot'. This allows a company to share 'real life' consumer reviews, user videos and endorsements of their product.
- Companies could use **product placements** in online videos or have their product endorsed by social media influencers, popular channels or celebrity accounts.
- Companies can use data from 'cookies' to **target individual marketing campaigns** based on location or historically browsing patterns.

This list is not exhaustive. Accept any other valid responses.

## Student responses

### Response A

A company would use social media to ~~market~~ market their product as the algorithm can select people to show the add to based off their past activities and related data, getting it out to a wider but more ~~specif~~ specialised audience. For example Instagram runs adds on both posts and the stories, selecting users that the product may favour based on the content they follow, pictures they have liked/saved, which focuses it towards a target audience. ~~Insta~~ Social media pages also allow marketing costs to decrease as the price of running ~~adds~~ ads or making a photo or video post is next to nothing in comparison ~~to~~ to the prices charged for run time on the TV or a billboard, helping out brands when they first start.

In this response the student demonstrates a detailed understanding of the social media context. They outline several key features such as **how** the use of algorithms allows companies to identify individuals within a target market based on their online activities. They then illustrate the point made by explaining how this occurs on a platform such as Instagram.

In the second half of the response they move on to explaining more about **why** a company may use this marketing method. They identify the activity of reducing costs and go on to link this to more traditional marketing methods.

Throughout their response they make reference to a range of techniques used by within social media activities including adverts, photos and videos.

The response covers the three main areas identified in the mark scheme and although it does not cover all of the points listed within the indicative content, the quality of the response scores full marks.

**6 marks**



## Response B

- Benefits to Social media marketing:
- Can be targeted at a specific target market
  - Can be seen globally by a huge audience
  - Much more ~~cost~~ cost effective than other ~~sources~~ <sup>sources</sup> of methods advertisement
  - Wide variety of different social media outlets available
- Can be done by:
- viral videos
  - Targeted ads
  - celebrity endorsement
  - Via company's own social media page
  - on other popular social media pages

In this response the student chooses to use bullet points to present their answer. This can be a useful way of organising a response, but the points made still require the necessary depth, accuracy and explanation.

The student makes a wide range of relevant points that address both the necessary 'how' and 'why' requirements of the question. They in fact provide more relevant points than the previous high-level response. The issue is that there is little justification provided.

Many of the points made are simple statements eg more cost effective, but here the student misses the opportunity to go on and explain factors such as the consumer paying the costs to go online.

Many of the other points made are simply presented as a list of statements.

Overall, the response lacks sufficient detail and explanation, although it does make a wide range of relevant points. They provide just enough detail for the student to access the middle mark band.

**3 marks**

## 7 mark question

Maths skills

### Question 6

**Figure 3** shows the current dimensions of a school desk.

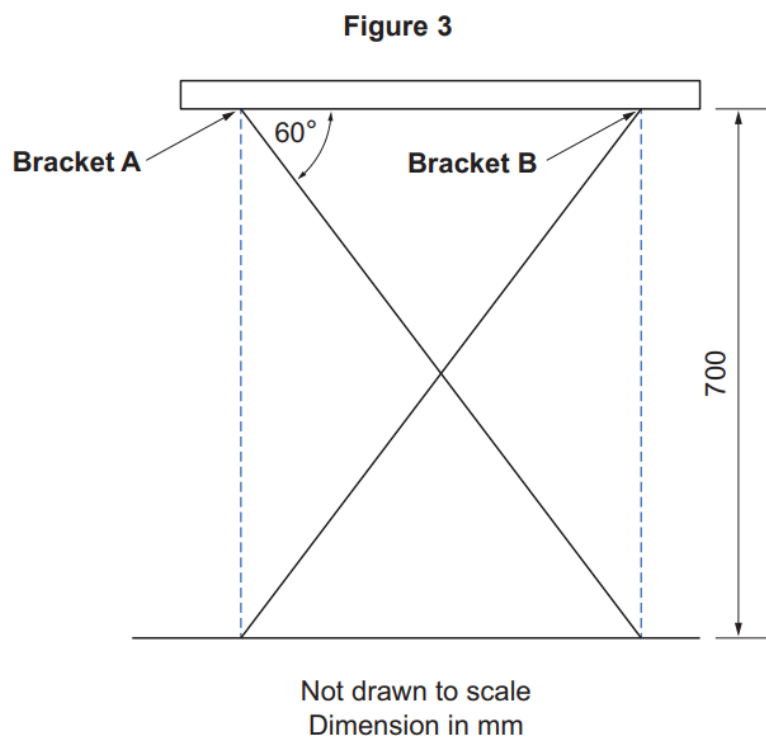
If all existing components are used, calculate how much closer together **Bracket A** and **Bracket B** would be at a new desk height of 720 mm.

Assume that when fully extended the end of each leg is vertically in line with the bracket on the underside of the desk.

**[7 marks]**

### Mark scheme

AO4 1c



<b>Calculate leg length (x)</b>	$\sin 60 = \frac{700}{x}$	1 mark (M1)
---------------------------------	---------------------------	----------------

(rearranged to)

$x = \frac{700}{\sin 60}$	1 mark (A1)
---------------------------	----------------

$$= 808.29$$

<b>Calculate the width between brackets with desk at new height (y)</b>	$y^2 + 720^2 = (\text{their } 808.29)^2$	1 mark (M1)
	(rearranged to)	

$y = \sqrt{(\text{their } 808.29)^2 - 720^2}$	1 mark (A1)
---	----------------

$$= 367.33$$

<b>Calculate the Original Width (z)</b>	$\tan 60 = \frac{700}{z}$	1 mark (M1)
---	---------------------------	----------------

(rearranged to)

$z = \frac{700}{\tan 60}$	1 mark (A1)
---------------------------	----------------

$$= 404.14$$

<b>Distance 'Bracket A' and 'Bracket B' are closer by</b>	Original Width – New Width	1 mark (A1)
---	----------------------------	----------------

$$= 404.14 - 367.33$$

$$= [36.5, 37] \text{ mm}$$

<b>Distance 'Bracket A' and 'Bracket B' are closer by</b> Where no working has been shown but final answer is accurate	$= [36.5, 37] \text{ mm}$	7 marks
---	---------------------------	---------

Note to markers :

- The order of the calculations may not follow that given in the mark scheme.
- Be aware of rounding taking place throughout the question.

## Student responses

## Response A

$$x = 700 \div \sin(60) = 808.29 \text{ mm}$$

$$\sin^{-1}\left(\frac{720}{808.29}\right) = 62.92$$

$$700 \div \tan(60) = 404.15 \text{ mm}$$

$$\sqrt{808.29^2 - 720^2} = 367.33 \text{ mm}$$

$$404.15 - 367.33 = 36.82 \text{ mm}$$

Distance between **Bracket A** and **Bracket B** is closer by =

36.82 mm

In this response the student has achieved full marks, as the final answer given of 36.82 mm is within the acceptable range provided in the marks scheme. The figures provided within the square brackets means that any answer within that range would be awarded full marks. The acceptable range enables students to still be rewarded for their answer if they have perhaps rounded a figure in an earlier calculation, or if they have used the full calculator figure with no rounding.

In the response the student clearly and logically works through the required stages of the question.

**7 marks**

## Response B

$$\frac{\sin 60}{700} = \frac{\sin 30}{x}$$

$$\sin 60 (x) = \sin 30 (700)$$

$$x = \sin^{-1} \left( \frac{\sin 30 (700)}{\sin 60} \right)$$

$$x = 404.15 \text{ mm}$$

$$\text{Area of } \square = 700 \times 404.15$$

$$\text{Area of } 720 \square \Rightarrow 282905 = x \times 720$$

$$= 282905 \text{ mm}^2$$

$$\text{Area of } 720 \square \Rightarrow 282905 = 720 \times x$$

$$282905 / 720 = 392.92 \text{ mm}$$

$$404.15 - 392.92$$

$$= 11.23 \text{ mm}$$

$$= 11.23 \text{ mm}$$

$$\frac{\sin 60}{700} = \frac{\sin 30}{x}$$

$$\sin 60 (x) = \sin 30 (700)$$

$$x = \sin 30 (700) / \sin 60$$

$$x = 404.15 \text{ mm}$$

Since area will remain the same.....

$$\text{Area of } 700 \text{ mm } \square \Rightarrow A = 700 \times 404.15$$

$$= 282905$$

$$\text{Area of } 720 \text{ mm } \square \Rightarrow 282905 = 720 \times x$$

$$x = 282905 / 720$$

$$x = 392.92 \text{ mm}$$

$$404.15 - 392.92$$

$$= 11.23 \text{ mm}$$

distance closer

Distance between Bracket A and Bracket B is closer by =

$$11.23 \text{ mm}$$

In this response the student has not achieved an accurate final answer. They have however correctly undertaken one correct calculation at the beginning of their written response.

Although not the exact method outlined in the mark scheme, the student has used a valid alternative method to calculate the original width of the table legs.

They were awarded 2 marks for this calculation, 1 method mark and 1 accuracy mark. Method marks allow students recognition for identifying the correct calculation or equation needed for a particular part of a question and accuracy marks rewards the correct answer. It is quite possible to score a method mark without achieving the correct final answer.

**2 marks**

## 9 mark question

Extended response

### Question 4

Explain how rapid prototyping has impacted on traditional manufacture.

**[9 marks]**

### Mark scheme

AO4 1b

Marks	Description
7–9 marks	A detailed and thorough understanding of how rapid prototyping has impacted on traditional manufacture. The response clearly identifies the impact that rapid prototyping has had on manufacture.
4–6 marks	The response demonstrates a good understanding of how rapid prototyping has impacted on traditional manufacture. Some relevant points relating to the impact on traditional manufacture are provided.
1–3 marks	The response offers a basic understanding of the benefits of rapid prototyping with limited reference to the impact on traditional manufacture.
0 marks	No response or nothing worthy of credit.

### Indicative Content

- Rapid prototyping has allowed companies the ability to develop and produce fully functioning prototypes without a huge financial investment in the manufacture of moulds or ancillary components.
- It has allowed for the design and manufacture of complex components that would have been prohibitive to manufacture traditionally.
- Rapid prototyping has removed the need for highly skilled manufacturers and tool makers as complex designs can be easily achieved without tooling.
- Traditional labour intensive manufacturing processes have been replaced by 3D printing that can run without supervision for extended periods of time without breaks or loss of concentration.
- A change in focus of manufacturers primary ability to work with physical materials to being competent to work in the field of CAD/CAM.
- A huge reduction in the lead time taken to design, produce, develop and test a physical product.
- The ability of a manufacturer to now perform many different techniques without the need to subcontract individual component parts out to specialist manufacturers.
- A reduction in the need for large industrial spaces and the investment in materials and machinery.



- The ability to create components from an ever-developing catalogue of material substrates.
- Rapid prototyping can be undertaken using a variety of substrates or materials.
- The move away from manufacturers designing components around stock forms and sizes of material.

**This list is not exhaustive. Accept any other valid responses**

## Student responses

### Response A

Rapid ~~prototyping~~ <sup>time spent in the</sup> prototyping has had a huge impact on decreasing the development stage of a product's life, it allows a design to be made ready for manufacture in a fraction of the time that traditional manufacture took. In traditional manufacture, prototypes had to be made by hand which is a time consuming and expensive process due to cost of materials. In rapid prototyping, processes such as fused deposition modelling (3D printing) and stereolithography allow prototypes and models to be made quickly and effectively, therefore reducing time ~~spent~~ spent in development compared to traditional manufacture. Rapid prototyping also reduces the need for other machinery that may have been required for traditional manufacture, nearly all aspects of a prototype/model can be made ~~with~~ <sup>with</sup> one machine (e.g. a 3D printer). Due to the accuracy of CAD/CAM, rapid prototyping makes it easy to create to-scale prototypes.



without needing to calculate an appropriate scale and adjust dimensions if you are making a prototype by hand. Rapid prototyping saves money that may have otherwise been spent on specialist materials and components for a prototype, equipment such as a 3D printer allows you to create 3D functional prototypes all from the same material. Overall, rapid prototyping saves time, money, and resources when getting a design ready for production.

In this response, the student begins by referencing the reduction in time taken for the development of a product. They explain relevant details about traditional manufacture processes and then compare these to developments in 3D printing. It is clear that they have some detailed knowledge about 3D printing, but only reference speed and efficiency. Had they developed these statements to discuss factors such as the ability to produce complex products, they may have received more marks in that area.

They then move on to addressing the reduction in machinery needed and how many processes can now be completed by 3D printing and also links this to a reduction in costs of machinery and resources.

The student has produced a detailed response and covered many relevant points which allow them to access the top 7 – 9 mark band. For them to have achieved maximum marks, they could have added a little more clarification to the points made.

**8 marks**

## Response B

3D printing

Rapid prototyping has meant designers and developers can produce physical models of their product ~~easy~~ easier and faster for the design stage of a products production. The most obvious example is 3D printing and how it has been used time and time again to help designers.

3D printing is much less expensive and time consuming compared to the original method, and it can also be used to produce moulds and dies for the actual final product, that the original modelling processes could not do. It can be used also remotely, with the designer sending the file to a printer closer to their developer or colleagues also working on the project. The printer, often simply uses an extruded line of polymer, working upwards in layers to reach a final outcome.

Metal 3D printers are similar, building the design up using melted metal to produce highly detailed outcomes. It also allows the designer to make designs that cannot be formed any other way.

Rapid Prototyping allows designers to ~~best~~ build models and designs more collaboratively, at a cheaper final cost (compared to older modelling methods) and allows them to incorporate details and ideas faster and easier for the designers.

In this response, the student starts by identifying 3D printing as a process that has made the development of models faster and easier. They go on to state that it less expensive and time consuming than traditional methods and begin to provide some more specific information such as its ability to be used remotely.

Still focusing on 3D printing, the student explains that designs can be produced that cannot be formed any other way. They also cover the ability to work collaboratively and mention costs and the level of detail achieved.

Overall the student does make a range of accurate points and it is clear that they have a good understanding of the topic. The response falls into the middle mark band, and it is the lack of explanation and comparison with traditional manufacture specifically that prevents them from accessing the top mark band.

**6 marks**

## Response C

Rapid prototyping has made the speed of manufacturing faster as it is easier to go from design to produce due to the increasing ~~technology~~ resourcefulness of technology when making the prototypes. Now instead of physical prototypes that could take weeks or ~~months~~ months to build, you can create the design on your computer and have it 3D printed within a few days. This has made traditional manufacturing a more costly method and has ~~decreased~~ ~~increased~~ the amount of time needed to finalise a product.

In this response the student has made some simple statements about rapid prototyping. They have made reference to it being easier, faster and cheaper than traditional manufacture and they have correctly referenced 3D printing as an appropriate rapid prototyping technique.

They have attempted to add some greater explanation by referring to 'weeks or months to build' and stating that traditional manufacture is 'more costly', but the response lacks breadth and sufficient detail.

**3 marks**

## 12 mark question

Extended analysis and evaluate

### Question 17

**Figure 8** and **Figure 9** show two novelty moneyboxes, each with a slot for coins located at the top.

**Figure 8**



**Blow moulded, low density polyethylene (LDPE) moneybox**

**Figure 9**



**Injection moulded, polymethylmethacrylate (PMMA) moneybox**

Analyse and evaluate the suitability of the materials and manufacturing methods used for each of the moneyboxes shown.

**[12 marks]**

### Mark scheme

AO3 2a

AO3 2b

Marks	Description
9–12 marks	The response shows a detailed analysis and evaluation of the suitability of the chosen material and manufacturing process of <b>both</b> moneyboxes. The response clearly evaluates how the properties of the material and the way in which they are manufactured affect the suitability of choice for the manufacture of the moneybox and its suitability in use. Not all elements of each moneybox are required to be covered in equal detail to access this band.
5–8 marks	The response shows good evaluation and analysis of the suitability of the chosen material and manufacturing process of <b>both</b> moneyboxes.
1–4 marks	Basic evaluation of the suitability of the chosen material and manufacturing process of each of the moneyboxes, but tends to be descriptive rather than evaluative.
0 marks	No response or nothing worthy of credit.

## **Indicative content**

### **Low density polyethylene (LDPE):**

- a tough material that will withstand the impact from coins being dropped into the moneybox
- a thermoplastic that can be easily pigmented in order to create the vivid red colour of the moneybox
- although available in translucent colours, the optical clarity of LDPE is not as good as PMMA
- LDPE can successfully have screen printed decals applied such as the eyes on the moneybox.

### **Blow moulding:**

- creates a one-piece hollow shape that would be suitable for the moneybox
- can produce an inconsistent wall thickness which may result in the moneybox breaking if dropped
- blow moulded products can be post processed in order to create the coin slot or the money bung
- the design of the moneybox is simple with no intricate features and therefore appropriate for manufacture by blow moulding
- is an ideal redistribution process for use with thermoplastics making it appropriate for moulding the LDPE moneybox.

### **Polymethylmethacrylate (PMMA) acrylic:**

- excellent optical properties that allow you to easily see the coins contained inside
- a rigid material that maintains the shape of the moneybox
- can be joined using solvent adhesives or friction welded
- prone to scratching from the coins which will reduce the aesthetics over a period of time
- a brittle material that may shatter or crack if dropped especially when holding a large volume of coins
- PMMA can successfully have screen printed decals applied such as the eyes on the moneybox.

### **Injection moulding:**

- can successfully create the shape and details found on the moneybox
- provides consistently accurate mouldings which are vital due to the small cross section of material found on the seam of the two halves of the pig and the aperture for the money bung
- is the most suitable manufacture method for high volume output, appropriate due to the market of the moneybox
- is an ideal redistribution process for use with thermoplastics making it appropriate for moulding the PMMA moneybox
- snap together fixings can be incorporated into the moulding to assist with the assembly of the moneybox.



This list is not exhaustive. Accept any other valid responses.

## Student responses

### Response A

Blow moulding is very suitable for the moneybox as it creates a seamless final product, blow moulding also creates products which are naturally hollow <sup>and don't require</sup> additional processes to create the internal cavity for the coins. Injection moulding requires a more complex die in order to create a hollow product, it could also be made from 2 separate halves which would require extra dies and more steps to the manufacture. Injection moulding therefore leaves a large seam on the final product (where the two halves of the die separate) and has a less smooth surface than blow moulding due to the sprue that has to be cut off. Blow moulding is the more suitable process as it only requires one, simpler die and creates a product with a better finish.

The LDPE is easy to pigment in a range of colours prior to the blow moulding process and can therefore match any décor in its surroundings. LDPE is rigid and will therefore maintain its shape even after impact from the falling coins. LDPE is also hard so

will not scratch when coins are placed in the box with excessive force.

PMMA is available in clear which allows the user to see how much money they have saved. PMMA is also tough so it is unlikely to crack or shatter if the moneybox is dropped from ~~a~~ large height. Finally ~~for~~ PMMA is easy to injection mould due to its relatively low melting point.

This student begins their response by discussing the manufacturing techniques for the moneyboxes. They provide detailed knowledge and understanding but also link the point made directly to the moneybox context eg "Create products which are naturally hollow and don't require additional processes to create the cavity for the coins". They go on to show good knowledge about the tooling needed for each of the processes and explain several possible methods of manufacture. The response misses the opportunity here to highlight the considerations relating to joining the two injection moulding halves, the weakness that this feature may produce, or the fact that it is feasible due to the accuracy of injection moulding.

All of the points made with reference to blow moulding and injection moulding are relevant and accurate, communicated using appropriate technical terminology such as 'injection moulding die', and illustrate detailed analysis and evaluation.

The student then moves on to addressing the suitability of each material for the moneybox context. They make a wide range of relevant points that are once again clearly linked to the moneybox context.

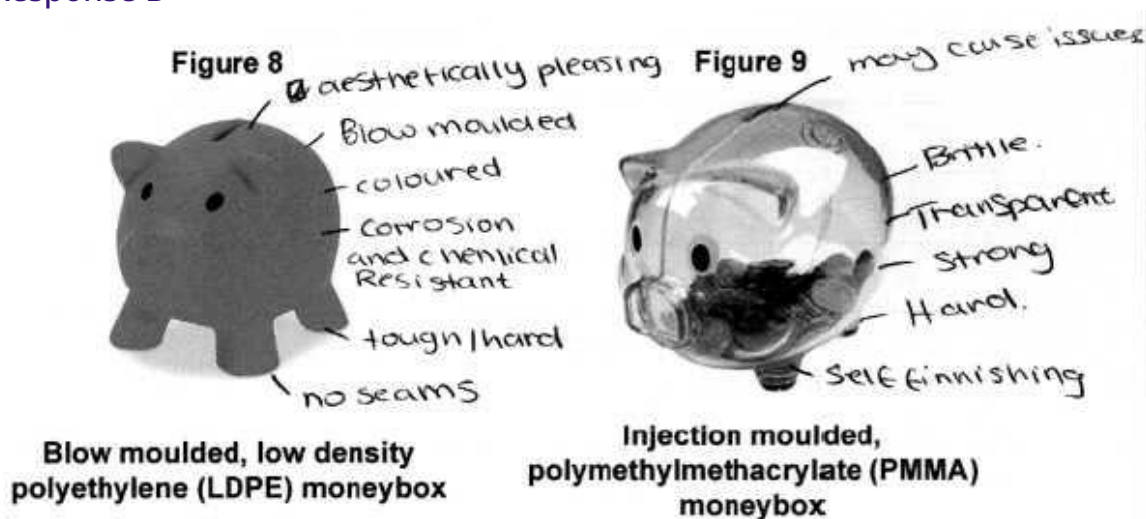
The volume of statements referring to each material are not balanced. This is often not necessary when answering a question with a level of response mark scheme.

In the final paragraph the student refers to the property of PMMA. Here they accurately refer to the transparent property and link it to the context, but they then go on to show some inaccuracy in their description of PMMA being a tough material.

Overall the quality of the response is excellent with the exception of some inaccurate properties of PMMA and as such scores towards the very top of the 9 – 12 mark band.

**11 marks**

## Response B



Analyse and evaluate the suitability of the materials and manufacturing methods used for each of the moneyboxes shown.

[12 marks]

As you may be able to see from figure 8 the LDPE moneybox has been produced through the method of Blow moulding which is an ideal method of creating this shape as it doesn't leave any lines and seams where the 2 mould come together. However, on Figure 9 you would be able to see that the PMMA money box has been made from Injection moulding, leading you to be able to see where the 2 moulds were making it look less aesthetically pleasing compared to the LDPE moneybox.

LDPE was an appropriate material to use for the money box due to its matt like self finishing which makes it more aesthetically



pleasing, ~~furthermore~~ <sup>furthermore</sup>, the use of the coloured pigment also adds to its looks. LDPE ~~is~~ is a strong lightweight material with good chemical resistance. ~~For~~ It is also very tough and hard making it ideal for a ~~money~~ <sup>money</sup> box as it is very likely to drop ~~meaning~~ <sup>unlikely</sup> it would be ~~unlikely~~ to break.

PMMA is also a suitable material for a ~~moneybox~~ <sup>moneybox</sup> due to the fact that it is a hard and strong material. However, more brittle and less tough compared to LDPE meaning it would be more susceptible to break and shatter when dropped. Another aspect that is a disadvantage is the seam going through the money box making that a weak point. PMMA is a very nice and aesthetically ~~is~~ <sup>is</sup> pleasing material as it can come in coloured ~~and~~ <sup>or</sup> transparent. It is also a self finishing meaning you wouldn't have to have any additives. The transparent form would allow you to see how full your ~~new~~ money box is compared to the LDPE one.

In this response the student begins by focusing on the manufacturing methods. There is some unnecessary repetition of the material provided in the question, but they do make some relevant points relating to the one-piece blow moulding and proceed to compare it to the two-piece injection moulding, correctly identifying that there would be a visible seam. The information provided is accurate and shows a good level of understanding, but many other relevant points are not referenced or understood.

The student then moves on to discuss the moneybox materials and it is clear that they have a greater depth of knowledge of the materials than the manufacturing processes. Many of the points that they make are wholly relevant and linked to the context such as the ability to pigment LDPE and the point that PMMA is more brittle and less tough than LDPE. However, they also make reference to points such as 'chemical resistance' which, although a property of LDPE, is not relevant when discussing the moneyboxes.

When the whole response is considered, it achieves 7 marks, which places it in the middle 5 – 8 mark band.

**7 marks**

## Response C

In Figure 8 there is a blow moulded, low density polyethylene moneybox. This is a suitable material for this product as it will be strong enough to hold the correct weight. It is also good for the aesthetics because it is coloured which is more appealing. Can also see the strength etc in the bottom of it as it looks very sturdy. Blow moulding is a fast way to produce products.

In Figure 9 there is an injection moulded, polymethylmethacrylate money box. This will still hold the correct weight needed for the moneybox. But we can see from the image that it is a thinner less sturdy material. I would say the aesthetics are weaker on this product as it is only clear and not coloured. Injection moulding is a very efficient way to produce this product as it is fast and allows for more detail.

Overall, I think that Figure 8 shows the more suitable product. As it is sturdier and more aesthetically pleasing.

The student lays out their response by covering each moneybox in turn. They make some very general points relating to strength and aesthetics, but none of the points made are explicitly justified or linked to the moneybox context. They correctly state that the LDPE pig is coloured and the PMMA pig is clear, but fail to use technical terminology such as opaque or transparent, and do not evaluate why these aesthetics features may be important for the moneyboxes shown.

In both paragraphs they make some reference to the speed of manufacture but neither of these are explained. When referring to injection moulding in the second paragraph they do show some understanding by stating that it 'allows for more detail', but again this is a very basic statement.

When the whole response is considered, the student achieves 2 marks.

It is worth highlighting that the first three lines of each paragraph simply repeat the material given in the question and students should be informed that these introductions are unnecessary.

**2 marks**

# Get help and support

Visit our website for information, guidance, support and resources at **[aqa.org.uk/7552](https://aqa.org.uk/7552)**

You can talk directly to the Design Technology subject team

E: **[dandt@aqa.org.uk](mailto:dandt@aqa.org.uk)**

T: **0161 957 3334**

Copyright © 2024 AQA and its licensors. All rights reserved.

AQA Education (AQA) is a registered charity (registered charity number 1073334) and a company limited by guarantee registered in England and Wales (company number 3644723).

Registered address: AQA, Devas Street, Manchester M15 6EX.

