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Examiners' Report

June 2013

GCSE Design and Technology: Resistant Materials Technology 5RM02 01

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Introduction

The format and structure of this question paper is now well established, it is clear that centres and candidates are familiar with the layout and have used past papers and previous examiners' reports during preparations for this examination.

On the whole candidate performance is improving on the two questions that assess Quality of Written Communication, by providing pieces of writing that are more structured. Candidates' level of response to the '*describe*' and *'explain'* type questions is also getting better.

There was some evidence of candidates not selecting a response for one or more of the multiple choice questions at the start of the paper. For this section, candidates are strongly encouraged to select an answer even if they are unsure.

Question 11 (a) (i)

This question was generally well answered with most of the correct responses related to cutting wood with some good responses discussing the cutting of joints and shoulders for tenon joints. In some instances candidates' responses were simply too basic and generic such as 'cutting'. Even though this is a basic level of questioning, candidates should be encouraged to be specific when it comes to naming or giving the use of tools and components in this section.

Question 11 (a) (ii)

The countersink drill bit was not very well known amongst candidates with most incorrect responses identifying it as some form of drill bit.

Question 11 (a) (iii)

On the whole the scriber's use was generally well known with its use described accurately. Although most incorrect responses were confused with the function of a centre punch.

Question 11 (a) (iv)

The knock down fitting was seemingly well identified and its use correctly given as being related to the joining and construction of flat-packed furniture.

Question 11 (b) (i)

This question part highlighted some confusion between a nut and a bolt. The washer as part B was identified by the large majority of candidates but A and C were often the wrong way around.

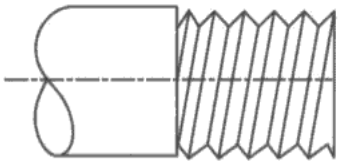
Question 11 (b) (ii)

This question required a choice between a permanent fixing and a temporary fixing. On the whole most candidates were able to correctly identify the fact that a nut and bolt is a temporary form of joining.

Question 11 (c)

This process appeared not to be widely understood by the large majority of candidates and many candidates did not attempt this question. When this question was attempted there were many vague responses demonstrating very limited understanding. When marks were awarded it was for the turning or twisting of the die/die stock with a second mark for the turning back to break/remove the swarf. Very few candidates mentioned starting the die square to the bar.

(c) The external screw thread shown below can be made using hand tools in a school workshop.



Complete the flow chart to show the correct sequence for cutting a screw thread. Some stages have been completed for you.

(3)

Put the die in the die stock

↓

File a chamfer on the bar and apply cutting compound

↓

line the die stock 90° to the rod

↓

Twist clockwise two turns

↓

twist counter-clock wise one turn

↓

Continue process until the screw thread is complete

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Examiner Comments

This response clearly shows that the candidate has a good understanding of the process and was able to convey it in very simple steps.

3 marks

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Examiner Tip

It is important that candidates are familiar with workshop processes even if they have not used them in the controlled assessment task.

Question 11 (d)

Most candidates were able to show that they had knowledge of at least one other form of joining metal involving the use of heat and in very many cases they were able to name two processes with welding and brazing amongst the most common responses.

Question 11 (e)

This question was generally well answered with most common correct responses being related to 'hard' and 'tough'. In some cases the explanation of these properties were confused but a good understanding of mild steel resisting wear and abrasion was demonstrated. Too many candidates referred to steel as being strong rather than having good compressive strength. General statements such as 'strong' should be avoided, it is better for candidates to provide some form of description relating to tensile or compressive strength. Too many candidates suggested that steel would not rust making it good for use outside.

Explain **two** advantages of making the wheelbarrow tray from mild steel.

(4)

1 Mild steel is tough and so will withstand sudden shock and identation which means you can put heavy objects in the wheelbarrow.

2 Mild Steel is malleable so you can make it that shape without fracturing. It is also lightweight and so you will be able to pick up the wheelbarrow.

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Examiner Comments

This candidate has provided two very good advantages here with a correct property and related point.

4 marks

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Examiner Tip

Candidates should ensure that when suggesting a property such as 'malleability', the reason is then related to the property, eg this candidate has done that by stating 'you can make it that shape without fracturing'.

Question 11 (f)

This question part was widely misunderstood by most candidates who confused the notion of reducing materials with some form of recycling once the product was finished with or the recycling of the waste during the production. Most correct responses focussed on making the material thinner, lay planning and the use of templates, pressing from a single sheet or welding rather than using additional components such as rivets.

(f) Explain **one** way in which materials can be reduced in the manufacture of the wheelbarrow.

(2)

The mild steel ~~used can be~~ can be welded together instead of using screwed joints where more materials are needed.

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Examiner Comments

This candidate has clearly identified two required elements for this questions Firstly, they have identified that the mild steel could be welded together which then means that the use of screwed joints could be eliminated therefore reducing the additional materials needed.

2 marks

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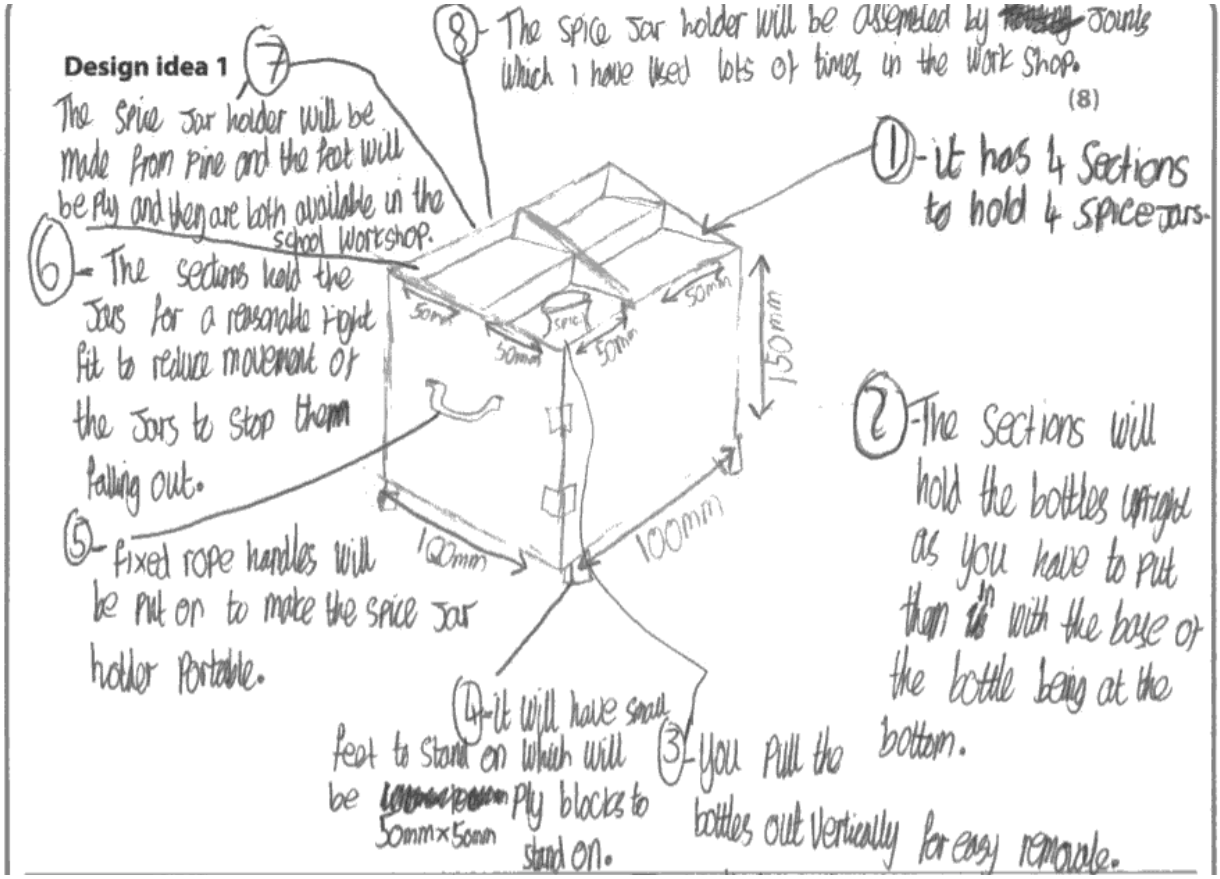
Examiner Tip

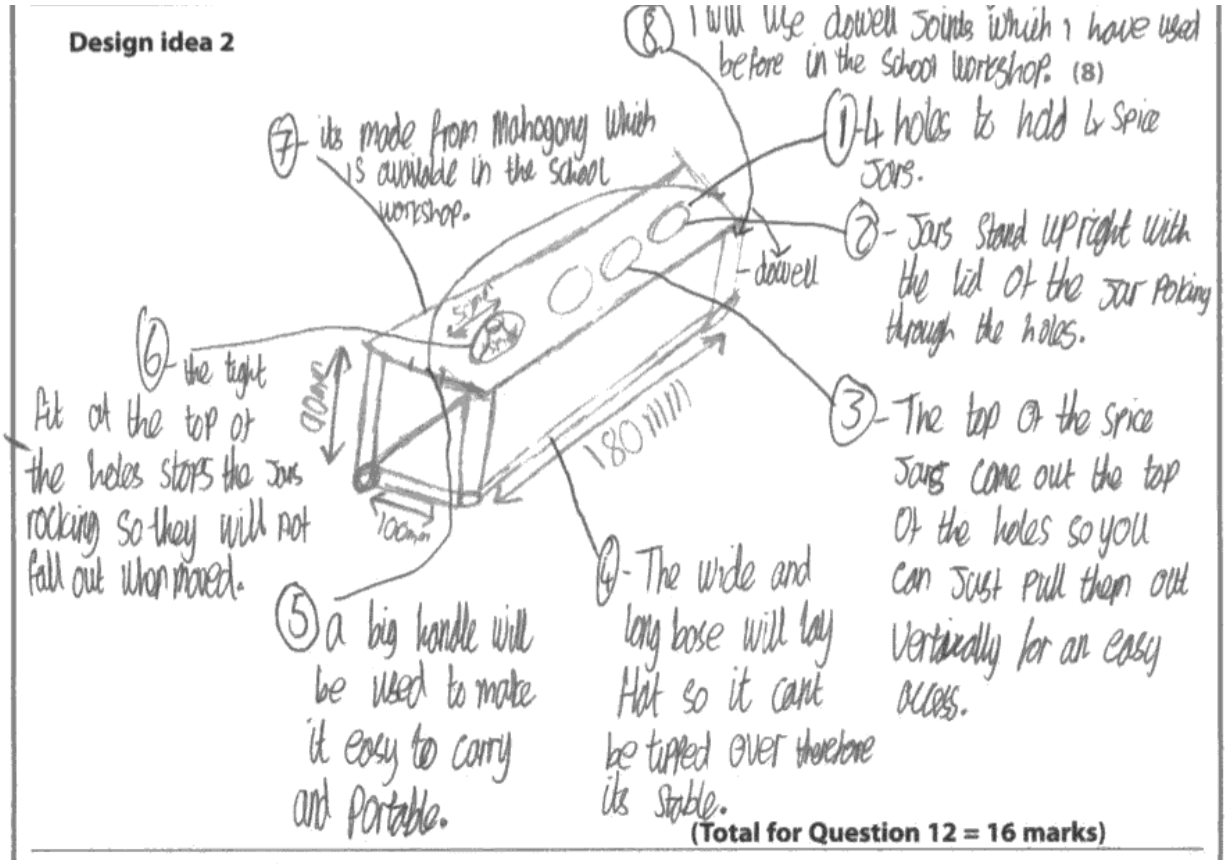
This is an 'explain' question which requires two separate parts; a point to be made and then justified and supported.

Question 12

The format of this question is very well established now and candidates are becoming more familiar with how to tackle it.

This question format is now well established and requires two different designs to be given in response to a number of specification points.





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Examiner Comments

This candidate has produced two very good design proposals and has scored a total of 15 marks. There is a clear simple sketch in the middle of the box which has been very well supported with some excellent annotation around the outside. You can see here that the candidate has numbered each of the specification points and has then identified where each of the points has been addressed.

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Examiner Tip

Try to avoid going outside the space provided here and do ensure that the problem is solved in two different ways, for example, if oak is suggested as a material for idea 1, it should not be suggested again for idea 2.

Question 13 (a)

This question produced a good range of correct responses. The most common responses were 'tough' and 'durable'. The most common incorrect responses seen were 'hard' and 'strong'.

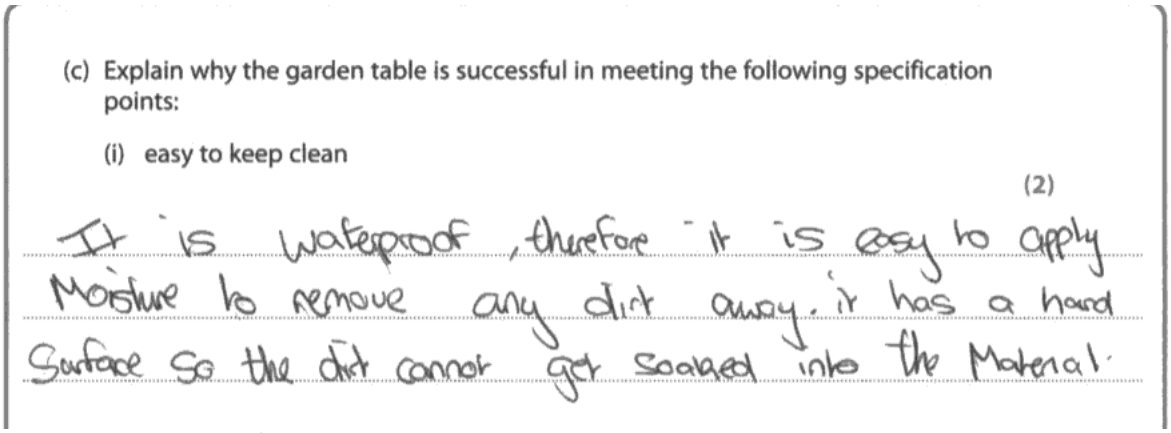
Question 13 (b) (i)

This question part was done quite well on the whole with most successful responses related to the appearance of the product and preventing rusting/increasing durability.

Question 13 (c) (i)

This part of the paper requires candidates to explain how the product successfully meets some form of performance criteria. It is crucial that candidates do not repeat part of the question, for example 'It is made from ABS which means it is easy to clean'. In this example the candidate would only score 1 mark because they have repeated part of the question, 'easy to clean'.

This candidate has given a good property of ABS here, 'it is waterproof' and then they have gone on the say how it is relevant to making the table easy to keep clean. 2 marks.



(c) Explain why the garden table is successful in meeting the following specification points:

(i) easy to keep clean

(2)

It is waterproof, therefore it is easy to apply Moisture to remove any dirt away. it has a hard Surface so the dirt cannot get soaked into the Material.

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Examiner Comments

Candidates should ensure that if they provide any properties of a material it must be relevant and specific to the product in question rather than giving a more general description of the property.

Question 13 (c) (ii)

The second part of the question follows the same format with the candidates being asked to explain how the product successfully meets a given point.

Again this second part asks how the product is successful in meeting some form of performance requirement.

(ii) easy to store away in winter.

(2)

It is a collapsable garden table and when it is collapsed it doesn't take up alot of room and is easily stored.

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Examiner Comments

This candidate has given a point 'it is collapsable' and then they have gone on to fully explain what this means in relation to making it easy to store away in winter in that 'it does not take up a lot of space'.

2 marks

Question 13 (d)

This part of the question paper also assesses 'Quality of Written Communication' and candidates are required to produce an extended piece of writing. Candidates must address both criteria and address how these relate to both products, in this case, two tables.

Evaluate garden table A compared with garden table B in terms of user requirements and sustainability.

(6)

Table A has an ABS top which can be melted and recycled whereas B has an oak top which is harder to recycle. ABS requires no secondary finishing whereas Oak requires a varnish or wax to prevent it from being damaged by water. Table A can be folded up which enables it to be easily stored away whereas B cannot be folded. Table B is more aesthetically pleasing as it is made from oak whereas A is made from ABS. Table B is smaller and the base is made from Aluminium making it more lightweight and therefore easier to move than A. The frame of B is made from Aluminium which is very easy to recycle whereas the frame of A is made of mild steel which requires a secondary finish making it less easy to recycle. The base of B has been cast, however, which is much more energy intensive than the bending of mild steel required to make the legs in A. Oak can be sustainable if FSC sourced whereas making ABS requires oil which is less sustainable.

(Total for Question 13 = 16 marks)

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Examiner Comments

This piece is a good length and covers both sets of criteria given 'user requirements' and 'sustainability'. This candidate has also made comparisons between tables A and B with respect to both criteria. They have used a good range of Design and Technology terminology accurately and coherently.

6 marks

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Examiner Tip

Candidates should ensure that both criteria given are covered. Candidates that provide a response based on only one of the criteria will not be awarded the full 6 marks available. Similarly, candidates that write about only one of the products, in this case table, will not be able to access all the marks available.

Question 14 (a)

This question simply requires candidates to give two properties of oak.

Most correct answers stated that oak is tough and durable. The most commonly seen incorrect responses seen were 'strong' and 'aesthetically pleasing'. As already stated in this report, strong on its own is not worthy of a mark and it must be qualified with some form of description such as tensile or compressive strength. Aesthetically pleasing is a characteristic and will not be so to all people.

Question 14 (b) (i)

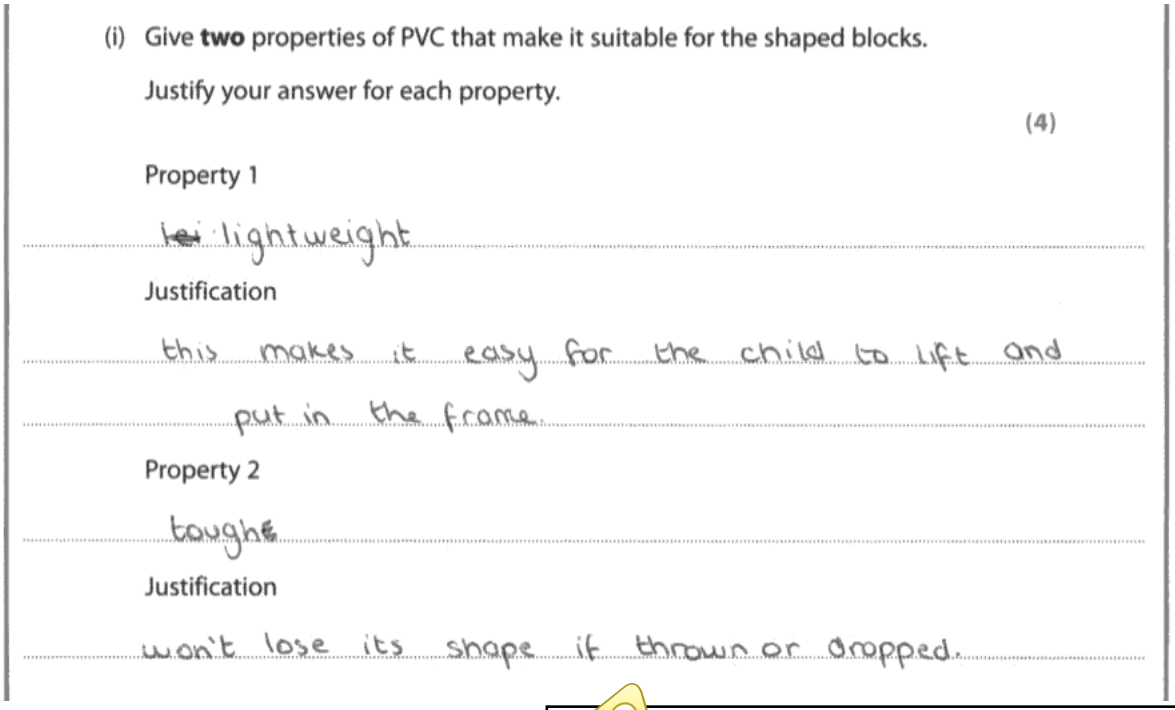
This type of question relies on basic factual knowledge and recall. On the whole this question was very well done. The types of joints are listed in the specification and it is expected that candidates can identify and name them.

Question 14 (b) (ii)

This question part was well answered by a large majority of candidates. Incorrect responses were often general names such as 'woodwork adhesive' or 'the white glue'.

Question 14 (c) (i)

For this question candidates were required to state two properties of PVC, and to justify the use of PVC in relation to the shaped blocks. The justification needed to be in context not just a simple definition.



(i) Give **two** properties of PVC that make it suitable for the shaped blocks.

Justify your answer for each property.

(4)

Property 1

~~lei~~ lightweight

Justification

this makes it easy for the child to lift and put in the frame.

Property 2

toughe

Justification

won't lose its shape if thrown or dropped.

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Examiner Comments

3 marks

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Examiner Tip

Ensure that the justification is linked to the product rather than a generic description. This candidate has related the weight of PVC to the ability of a child to be able to lift it. However, when they give the property of toughness, which is correct, it is rather general, and does not relate to the shaped blocks.

Question 14 (c) (ii)

This is a recall type question in the context of naming a process that could be used to make hollow products. Many incorrect responses suggesting vacuum forming were seen along with injection moulding.

Question 14 (d)

This question was very well answered by some candidates but most candidates were able to secure a mark even if they were not able to go on and fully describe two advantages.

(d) The final toy design was virtually modelled and tested using computer-aided design (CAD).

Describe **two** advantages of virtually modelling and testing the final design using CAD before starting manufacture.

(4)

1 The modelling can quickly and accurately allow the manufacturer to test for any problems with the product before manufacture started, so that faulty products are not manufactured & materials & time wasted.

2 Virtual modelling & testing allows the model to be easily altered & changes made if necessary, so a new prototype does not need to be made every time a change is made.

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Examiner Comments

Two descriptions required here related to the use of virtual modelling. Each point given needs to be backed up saying what benefit it might have. In this example the candidate has given two good advantages and on each occasion has gone on to say how that advantage is a benefit.

4 marks

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Examiner Tip

For describe and explain type questions candidates should try to make good use of 'connectives' such as 'which means', 'therefore', 'so that' etc.

Question 14 (e)

This question was poorly answered with very few candidates having a clear and detailed understanding of the concept of built-in product obsolescence yet most of them being exposed to it in some form of another via mobile phones and digital devices. Most candidates ended up discussing the benefits of recycling and how this impacted landfill sites when throwing things away.

*(e) It is said that we live in a 'throwaway' culture.

Discuss the ways in which built-in product obsolescence contributes to a 'throwaway' culture.

(6)

It contribute's because company's make better product's than their previous one's. Those product's meet more user requirement's and become better looking. An example of this is phone's, once the new model come's out none of the customer's want the old model because the new one is faster, better looking, ~~er~~ ability to do more thing's. As a result of this the old one's get thrown away and replaced by the new.

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Examiner Comments

This question type requires candidates to produce a short piece of writing and will be assessed for the quality of written communication. Tables, lists and bullet points should be avoided. Candidates should be looking to demonstrate their knowledge and understanding of Design and Technology terms and subject vocabulary, the best way to show this is by writing in full coherent sentences.

3 marks

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Examiner Tip

Candidates performed well when they were able to give examples of products with 'built-in obsolescence'.

Paper Summary

Based on their performance on this paper, candidates are offered the following advice:

- Familiarity with all areas of the specification via teacher led examples or demonstrations
- For the design question, ensure that each of the two different design ideas are different in each of the given specification areas
- Name specific materials rather than material groups (eg wood, metal, plastics)
- Try to avoid going out of the boxes provided in the question paper when generating design ideas

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