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# Examiners' Report

## June 2017

GCSE Design and Technology  
Resistant Materials Technology 2  
5RM02 01

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## Introduction

This series is the penultimate one for this endorsed specification. As such, centres are very familiar with the style and layout of the paper; it was encouraging to see a healthy number of new centres enter candidates for this exam this summer.

It is clear that candidates continue to improve in many areas as was evidenced by the papers and levels of responses observed during the marking window.

It is worth noting that this year has seen an increase in the number of candidates writing far too much resulting in the excessive use of additional sheets needing to be attached. There has also been an increase in the number of candidates writing outside of the space provided. It was also reported by a very good number of examiners that the general standard of handwriting is declining which makes it very difficult to read candidates' responses.

### **Question 11 (a) (i)**

This question was generally well answered with many candidates giving the correct response. Those candidates who did not give the correct response, most commonly thought that the component was a screw with some thinking it was a nut.

### **Question 11 (a) (ii)**

Again, this question was well answered with very many candidates giving the correct response. Those remaining candidates often named the tool generically as a saw, but in this situation specific names need to be given.

### **Question 11 (a) (iii)**

With the popularity of laser cutters in schools and colleges, it was not that surprising that the very large majority of candidates correctly gave a correct use of laser cutting.

### **Question 11 (a) (iv)**

The very large majority of candidates were not able to give the correct use of the tap wrench. Many candidates made mention of tightening taps and nuts, whilst many made reference to it being used to cut threads without the addition or inclusion of any form of tap, be it a taper, second or plug tap.

### **Question 11 (b) (i)**

This type of question is recall in some respects in relation to being able to name two different properties of aluminium. A good number of candidates were able to name at least one property with excellent resistance to corrosion/ will not rust being the most commonly seen response. It is worth noting that with this type of question it is really important that the properties are relevant to the product and context and not simply generic properties of the material.

### **Question 11 (b) (ii)**

This question was about testing candidates' knowledge of non-ferrous metals but again within the context of the wind chime. As such many of the non-ferrous metals named were not appropriate, gold for example. A very good number of candidates were able to score at least one of the two marks available for this question.

### **Question 11 (c)**

Many candidates were able to correctly name at least two of the required three tools in this question. As with question 11aii, the use of the generic term 'saw' was not acceptable for a mark, nor was the use of a file which would be used on metal and not wood.

### **Question 11 (d) (i)**

This was an 'Explain' type question which required candidates to make a point and then develop it to say why or what the benefits or consequences are. Each single 'Explain' is worth 2 marks, with two explanations being asked, for a total of 4 marks on offer.

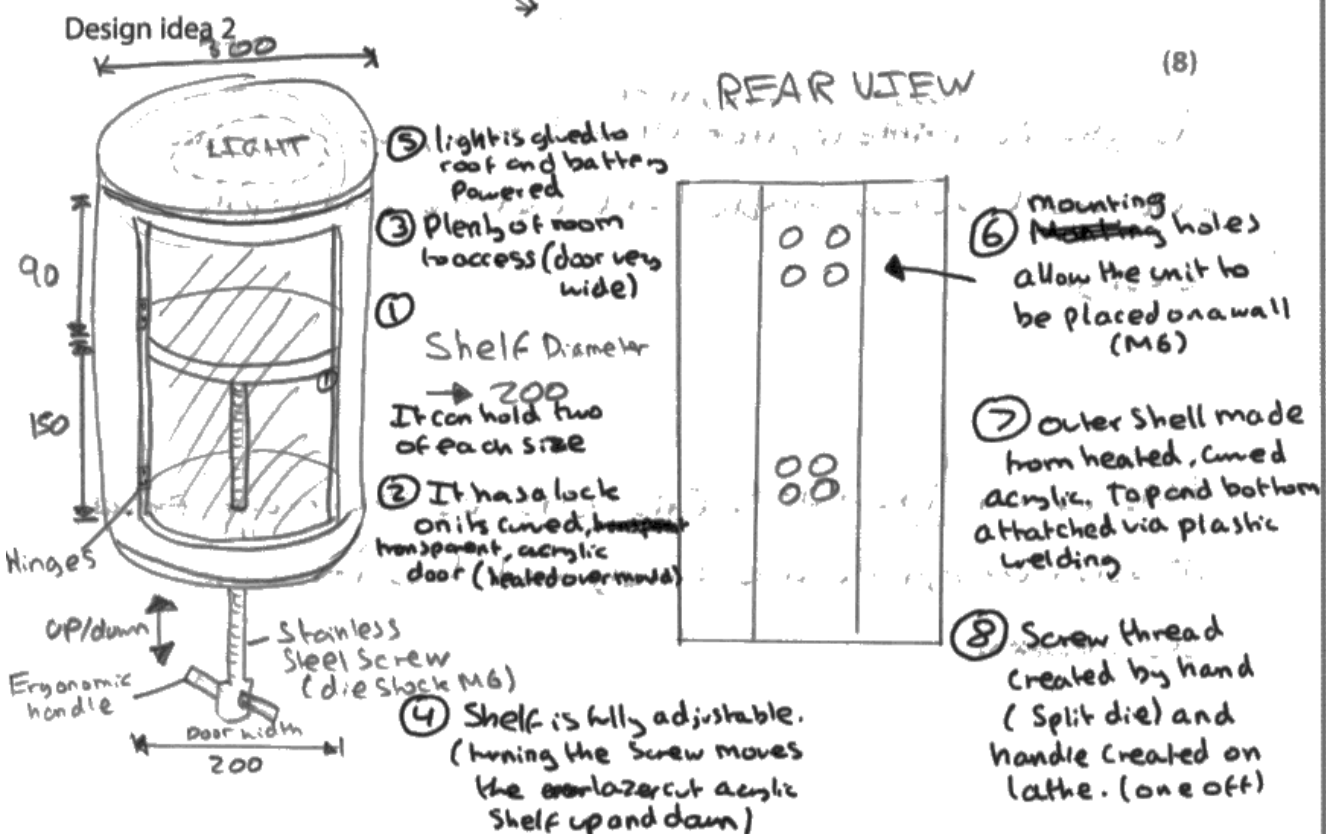
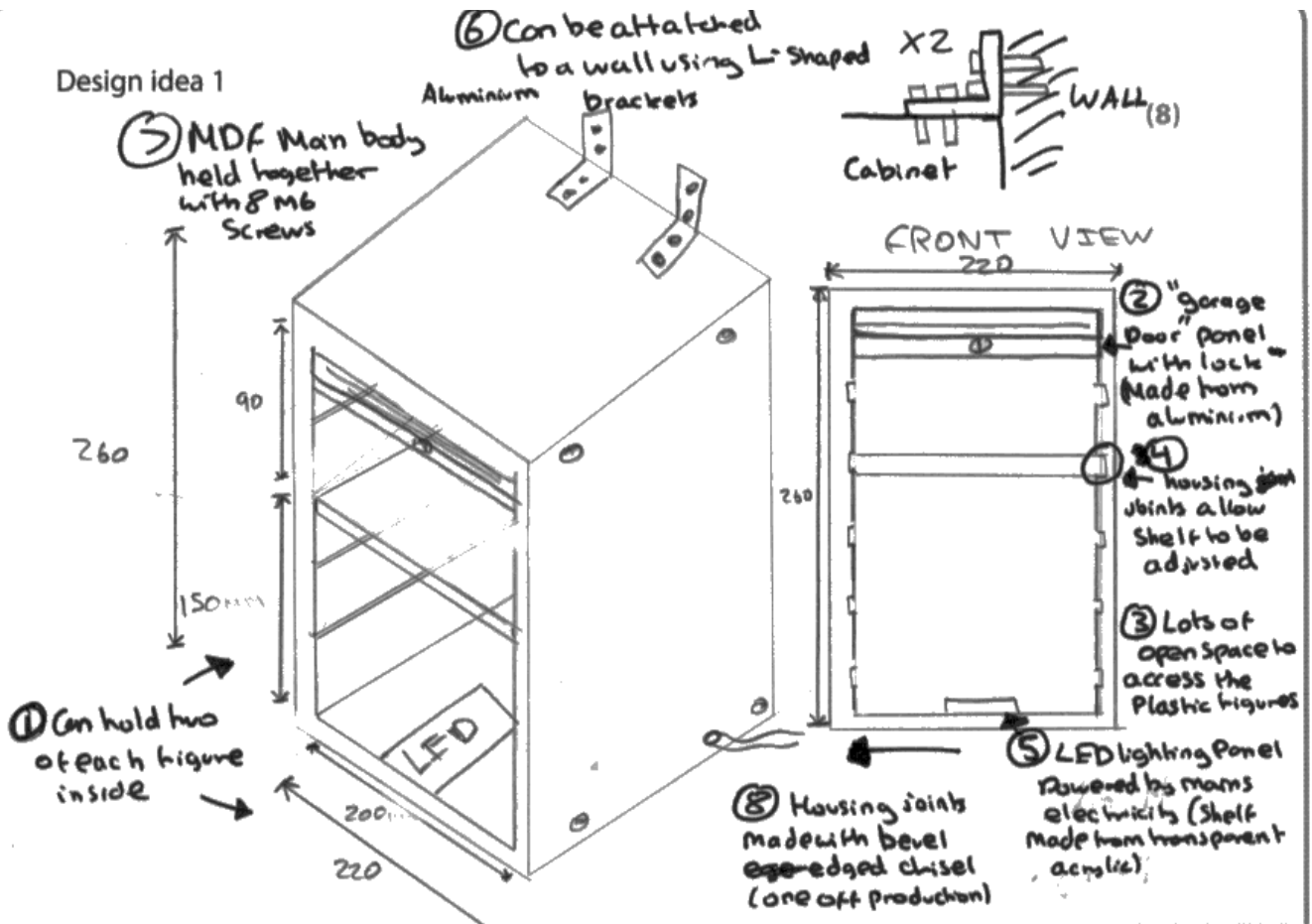
On the whole this question was not well done by candidates. The most common responses seen were related to pine being tougher or more durable than MDF without candidates going on to say what the benefits were. In these instances, candidates limit their marks by not making an attempt to explain the benefits of pine being more durable than MDF.

### **Question 11 (d) (ii)**

Another 'Explain' type question but on this occasion candidates scored a little better than they did on question 11di. Many generic responses were seen which made reference to 'being better for the environment' without saying exactly how or why and therefore candidates were restricted to scoring single marks.

## Question 12

The design question is now very well established. The question requires two different designs to be proposed in response to a set of specification points.





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**Examiner Comments**

The candidate has produced two good designs in response to the brief and has scored a total of 13 marks, 7 for the first response and 6 for the second. Try to avoid writing too much, a simple word or two will often suffice. However, in this case the candidate has numbered their response to identify each of the eight separate specification points.



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**Examiner Tip**

Be careful when the question asks for a light source for example. If you simply label your design to say 'includes a light source' you are not going to get the mark unless you give a specific type of light source such as an LED or a spot light for example.

### Question 13 (a) (i)

Just as with question 11bi, this question required two properties of a material, in this case brass, which made it an appropriate choice of material for the desk lamp. Many correct responses seen were about brass not rusting or that it has excellent resistance to corrosion, or that it was heavy or dense, all of which are correct. Many incorrect responses were often related to brass being a non-conductor which is of course not true.

### Question 13 (a) (ii)

(ii) Explain **one** reason why brass is a better choice of material than acrylic for the base of the desk lamp.

(2)

Brass is heavier than acrylic  
which makes it ideal for the base as this  
means it will not get knocked over as easily



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**Examiner Comments**

Given that this is an 'Explain' type question, it is very good to see that this candidate has provided a fact about brass in relation to acrylic ('It is heavier') but they have subsequently gone on to say why that fact is relevant, in this case, making it more stable and less likely to be knocked over.



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**Examiner Tip**

It is always a good idea to make sure that you know a few properties about each of the named materials in the specification.



### Question 13 (b)

A good number of candidates scored one mark on this question for stating something about PVC. However, there were many responses stating that PVC is waterproof, which is correct, but it is not relevant given the context of the sleeving around the electrical cable.

(b) The electric cable is coated with a thin layer of PVC

Explain **one** reason why the electric cable is coated with a thin layer of PVC.

(2)

because the pvc does not conduct  
electricity so means that people  
using the lamp cannot get shocked,  
for safety reasons.



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**Examiner Comments**

As we have seen before, this type of question requires some factual knowledge about PVC but in the context of the electrical cable. This response scored 2 marks, 1 for stating that PVC does not conduct electricity and 1 for saying that users will not get shocked.



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**Examiner Tip**

Think about what you know about PVC in this instance and decide what it is about PVC that makes it appropriate given the context; in this case the main reason is for protecting any users from electrical shock.

### Question 13 (c) (i)

The format of this question is well established and follows the pattern of this product analysis question.

A very good number of candidates scored very well on this question with many making reference to the fact that the lamp shade is hinged and can be rotated or adjusted.

The most common issue with this question is where candidates repeat the question: 'It has a hinge which means it can be used to light up different areas'. This will only score 1 mark for identifying that the lamp has a hinge; no mark will be awarded for repeating the question part.

### Question 13 (c) (ii)

The format of this question is well established and follows the pattern of this product analysis question and follows on from 13ci.

A good number of candidates scored well on this question with many making reference to the fact that brass is heavy or that the lamp has a big stable base with a large surface area.

As with 13ci the most common issue with this question is candidates merely repeating the question.

(ii) will not fall over.

(2)

Brass bottom so it is heavy  
enough to stable the glass, so  
it wont topple over and break



#### ResultsPlus Examiner Comments

1 mark has been awarded for the fact that glass is heavy and a second mark has been awarded to say that it makes it stable.



#### ResultsPlus Examiner Tip

A short but concise answer showing clearly that there is sufficient space to give a full answer within the space provided without the need to write too much.

### Question 13 (d)

Another well-established question type which candidates are getting better at responding to. However, in an increasing number of cases, we are seeing candidates write far too much here.

It is essential that candidates respond to the two criteria given, in this case form and user requirements. If candidates discuss other areas they will not be given any credit despite this question being marked with a levels-based marked scheme, judging the quality of their written communication.

Evaluate desk lamp A in comparison to desk lamp B in terms of form and user requirements.

(6)

Desk lamp A has a stable base so it will not topple over whereas desk lamp B does not have a stable surface. Desk lamp A is mains powered which means it will always be working unless there is a power failure and this eliminates battery costs whereas desk lamp B is battery powered which means you will have to keep replacing batteries. Lamp A has lamp ~~on~~ at adjustable height but lamp B is too lower down which could create problem. Desk lamp A can be put anywhere as it has a stable base but desk lamp B has to have a desktop as it has to be clipped on it. ~~Its~~ Lamp A makes it easy to light up different areas of desk by using hinge but lamp A can only shine light at one area. Lamp A is joined together strongly and is tough but lamp B ~~is~~ is very thin so there are chances of it breaking.



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### Examiner Comments

A very well written response, neat handwriting and well laid out. This candidate has considered both form and user requirements here and has kept to the space provided. This response has scored 5 out of 6 marks. If the candidate had just explored the two areas in a little more detail they would have scored the full 6 marks available.



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### Examiner Tip

It is worth making sure that you cover both areas, in this case form and user requirements. You can try using subheadings to show the two areas you are writing about. Avoid using bullet points or drawing a table; this question requires you to write at some length using appropriate technical language and vocabulary.

### Question 14 (a) (i)

A very straightforward question that only required one other method of joining the mild steel frame other than welding which was given in the question.

It was clear that a large number of candidates had not read the question in enough detail to avoid giving welding or a different form of welding as their answer.

Hot glue gun was seen on numerous occasions which is surprising, given the context.

### Question 14 (a) (ii)

This question required two explanations as to why mild steel was an appropriate material for the car.

On the whole this question was poorly done with very few candidates scoring full marks.

Good compressive strength was the most commonly seen correct answer for one mark. Too many candidates merely stated that mild steel was strong but this will not score any marks unless they say what type of strength it has, in this case compressive strength.

### Question 14 (b)

This question was done very well by a good number of candidates.

The most commonly seen responses related to the use of welding or darkened goggles to protect eyes and gloves to prevent against any 'splash' or sparks created.

(b) Describe **two** health and safety precautions that should be taken when welding.

(4)

1 should wear thick gloves to prevent your hands from being burnt ~~what~~ whilst welding.

2 should cover eyes in case any sparks fly up and hit your eye, causing you to go blind.



#### ResultsPlus Examiner Comments

This candidate has given two safety precautions and has been able to go on and state or explain the benefits of taking those precautions. As such, this response has scored the full 4 marks available.



#### ResultsPlus Examiner Tip

Good clear handwriting in the spaces provided makes this answer very straightforward and easy to read.

### Question 14 (c)

The use of jigs was questioned here in the context of the mild steel chair.

The most commonly observed responses related to the different bits being held together, meaning that they will not move during the welding process.

Many incorrect responses made references to making the welding process more accurate.

(c) The metals parts are held in a jig when they are being welded.

Explain **two** reasons why a jig is used when the parts are being welded.

(4)

- 1 The jig holds the metal parts in place allowing for a more accurate weld at the right angles.
- 2 The Jig means that the user does not have to hold the metal risking being hurt.



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Examiner Comments

This response scored the full 4 marks for two good reasons with appropriate explanations.



### Question 14 (d)

Another well established question to end the paper with which tests a specifically focused aspect of the specification.

It is essential here that candidates focus on the specific area of the question and context and not to take a generic approach to the subject area.

This question saw many candidates write generically CAD rather than virtual modelling.

**\*(d) A new chair frame is to be designed using a CAD system.**

**Discuss the advantages and disadvantages of using CAD for virtual modelling and testing the designs.**

The advantages of CAD are that you are able<sup>(6)</sup> to create the model without wasting any materials reducing the impact on the environment. When using virtual modelling you are able to change aspects very easily without having to rebuild the product. Using a CAD system for virtual modelling allows you to easily send the virtual model to someone in another place for example another country almost instantly. Finally the virtual model created can be perfectly accurate allowing you to easily notice any faults.

The Disadvantages on using CAD are that you are unable to test the model in a real~~life~~ setting. With a physical model you can test different finishes for the product or its stability or its ability to withstand stress. As a virtual model is not real you are limited in the number of ways you can test the product. Finally if the file is accidentally deleted you are unable to recover it whereas you would be very unlikely to lose a real life model.

**(Total for Question 14 = 19 marks)**



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**Examiner Comments**

This candidate has considered both the advantages and disadvantages of using CAD for virtual modelling and testing rather than a more general use of CAD. This response scored the full 6 marks for a well-balanced and written response which used appropriate technical language. The candidate also demonstrated a very good level of spelling, punctuation and grammar.



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**Examiner Tip**

If you are asked about the advantages and disadvantages of something, make sure you consider both equally, and do not forget to address both sides of the issue.



## Paper Summary

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

- The use of additional sheets is to be strongly avoided, there is sufficient space on the paper to be able to write a comprehensive response which is capable of scoring full marks.
- Candidates should avoid leaving the multiple choice questions unanswered. They should be encouraged to make a guess if they do not know. Candidates also need to follow the correct rubric if they want to change their answer and advised not to mark several responses as correct since they will end up scoring zero marks.
- Candidates are advised to keep any annotations around their design work, question 12, to a minimum. It is sufficient to say 'laser cut in acrylic' as an annotated note to a drawing, which would score 2 marks in this instance, 1 for a manufacturing process and 1 for a material.
- Try to avoid writing too much.
- Be specific in your answers, not vague.

## Grade Boundaries

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