






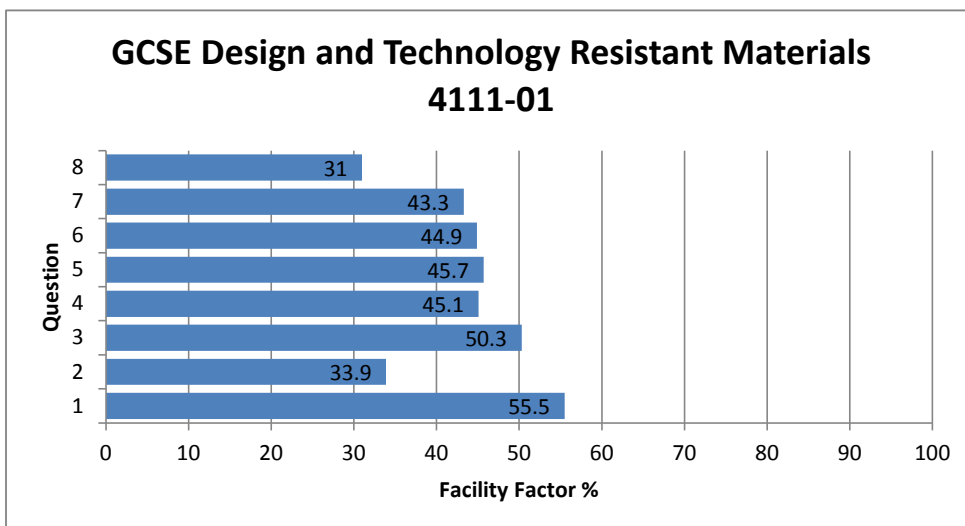


GCSE Design and Technology Resistant Materials 4111-01

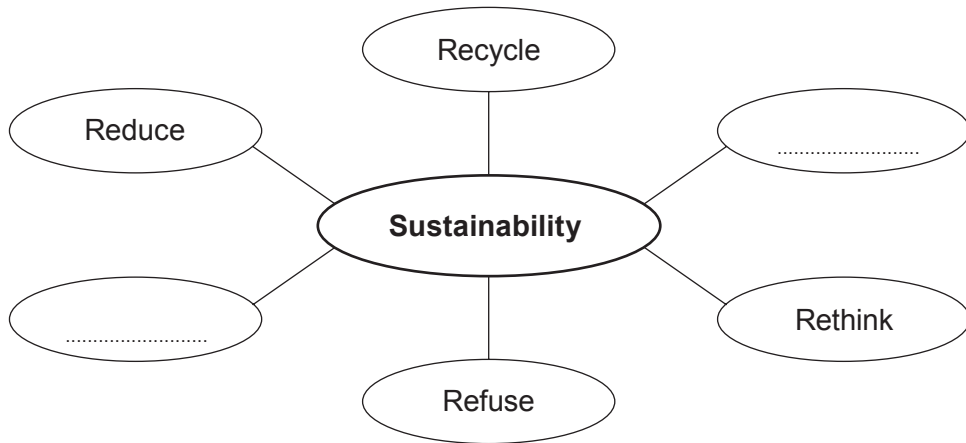
All Candidates' performance across questions

 Question Title	 N	 Mean	 SD	 Max Mark	 FF	 Attempt %
1	6150	8.3	2.6	15	55.5	100
2	6139	3.4	2.1	10	33.9	99.8
3	6142	5	2.3	10	50.3	99.8
4	6148	11.3	4.6	25	45.1	100
5	6141	4.6	2.2	10	45.7	99.8
6	6139	6.7	2.8	15	44.9	99.8
7	6140	8.7	3.6	20	43.3	99.8
8	6104	4.6	2.7	15	31	99.2



2. This question is about the general issues of Design and Technology. It is worth a total of 10 marks.

(a) Complete the chart below by adding the **two** missing Rs of sustainability. [2]



(b) State the specific material referred to by **each** of the recycling symbols shown below. [2]



.....

.....

(c) Five step Risk Assessments are undertaken in working environments in order to consider the risks of carrying out a making process.

Complete the five step Risk Assessment below. [2]

1. Identify the hazards.
2.
3. Evaluate the potential risk.
4. Record the findings.
5.

(d) Complete the following definition of a LCA.

[2]

“A Life C..... A..... is a method used to measure and evaluate the impact of a product on the environment”.

(e) Explain the purpose of the British Standards Institution (BSI).

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~~Plastic~~ Tin



Polypropylene

- (c) Five step Risk Assessments are undertaken in working environments in order to consider the risks of carrying out a making process.

Complete the five step Risk Assessment below. [2]

1. Identify the hazards.
2. Get rid of the hazards
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4. Record the findings.
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(d) Complete the following definition of a LCA.

[2]

"A Life Cycle Analysis is a method used to measure and evaluate the impact of a product on the environment".

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[2]

To make sure that British products quality as safe to use and meet the criteria as needed.

Examiner
only011
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1



~~Plastic~~ Tin



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Examiner
only

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2-

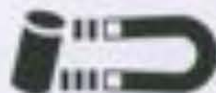
⑧

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Ferrous material
can



Polypropylene Plastic

(c) Five step Risk Assessments are undertaken in working environments in order to consider the risks of carrying out a making process.

Complete the five step Risk Assessment below. [2]

1. Identify the hazards.
2. How high the risks are
3. Evaluate the potential risk.
4. Record the findings.
5. Solution to risks

- (d) Complete the following definition of a LCA. [2]

"A Life cycle aided is a method used to measure and evaluate the impact of a product on the environment".

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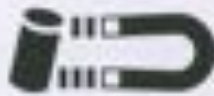
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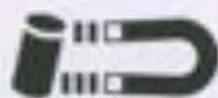
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magnetic



recyclible

(c) Five step Risk Assessments are undertaken in working environments in order to consider the risks of carrying out a making process.

Complete the five step Risk Assessment below. [2]

1. Identify the hazards.
2. check equipment
3. Evaluate the potential risk.
4. Record the findings.
5. improve the situation / equipment

(d) Complete the following definition of a LCA. [2]

"A Life cycle Analysis is a method used to measure and evaluate the impact of a product on the environment".

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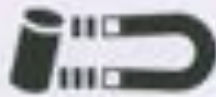
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Examiner
only
2

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[2]

to ensure the product is of a good quality to be sold

2

5

6. This question is about Materials and Components. It is worth a total of 15 marks.

- (a) Metal alloys are a mixture of two or more metals. Correctly match the following alloys to the metals from which they are made. [4]

Stainless steel

Brass

Duralumin

Bronze

Metals**Alloy**

Copper (65%) + Zinc (35%)

=

Steel (72%) + Chrome and Nickel (18%)

=




Aluminium (95%) + Copper (4%) + Magnesium (1%)

=

Copper (90%) + Tin (10%)

=

- (b) Complete the table by **underlining** the correct words from **each** list. (The first product has been completed as an example.) [4]

Product	Material	Classification
 Metalworking vice	Aluminium <u>Cast iron</u> Pewter	<u>Ferrous metal</u> Non ferrous metal
 Electrical socket	Urea formaldehyde Polystyrene Acrylic	Thermosetting plastic Thermoplastic
 Mallet	Chipboard Beech Balsa	Hardwood Softwood Manufactured board

(c) State the correct name of the **two** Knock Down Fittings (KDFs) shown below. [2]



(i)

(ii)

(iii) Describe **one** advantage to the consumer of buying products that are assembled using Knock Down Fittings (KDFs). [2]

.....
.....
.....

(d) (i) State the correct name of **one** smart material that you have studied. [1]

.....

(ii) Describe how the properties of the smart material named above can be used in a specific product. [2]

.....
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~~Duralumin~~

~~Bronze~~

Metals

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Aluminium (95%) + Copper (4%) + Magnesium (1%)

Copper (90%) + Tin (10%)

Alloy




= Brass

= Stainless steel

= Bronze

= Duralumin

- (b) Complete the table by underlining the correct words from each list. (The first product has been completed as an example.) [4]

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 Mallet	Chipboard <u>Beech</u> Balsa	<u>Hardwood</u> Softwood Manufactured board

(c) State the correct name of the two Knock Down Fittings (KDFs) shown below. [2]



(i) Clamp



(ii) Pin

(iii) Describe one advantage to the consumer of buying products that are assembled using Knock Down Fittings (KDFs). [2]

They are quick to assemble as they may not require tools.

(d) (i) State the correct name of one smart material that you have studied. [1]

Thermo chromic ink

(ii) Describe how the properties of the smart material named above can be used in a specific product. [2]

It can ^{be} used ~~to~~ ~~the~~ as a paint which changes colour according to temperature.

6. This question is about Materials and Components. It is worth a total of 15 marks.

- (a) Metal alloys are a mixture of two or more metals. Correctly match the following alloys to the metals from which they are made. [4]

~~Stainless steel~~

~~Brass~~

~~Duralumin~~

~~Bronze~~

Metals

Copper (65%) + Zinc (35%)

Steel (72%) + Chrome and Nickel (18%)

Aluminium (95%) + Copper (4%) + Magnesium (1%)

Copper (90%) + Tin (10%)

Alloy




= Brass ✓

= Stainless steel ✓

= Bronze ✗

= Duralumin ✗

- (b) Complete the table by underlining the correct words from each list. (The first product has been completed as an example.) [4]

Product	Material	Classification
 Metalworking vice	Aluminium <u>Cast iron</u> Pewter	<u>Ferrous metal</u> Non ferrous metal
 Electrical socket	<u>Urea formaldehyde</u> Polystyrene ✓ Acrylic	Thermosetting plastic <u>Thermoplastic</u> ✗
 Mallet	Chipboard ✓ <u>Beech</u> ✓ Balsa	<u>Hardwood</u> ✓ Softwood Manufactured board

(c) State the correct name of the two Knock Down Fittings (KDFs) shown below.

[2] Examiner only



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[2]

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1

2

8

6. This question is about Materials and Components. It is worth a total of 15 marks.

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Stainless steel

Brass

Duralumin

Bronze

Metals

Copper (65%) + Zinc (35%)




Steel (72%) + Chrome and Nickel (18%)

Aluminium (95%) + Copper (4%) + Magnesium (1%)

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Alloy= Brass= Stainless steel= Duralumin= Bronze

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- (c) State the correct name of the two Knock Down Fittings (KDFs) shown below. [2]



(i) Dowel joint



(ii) Nut and bolt

- (iii) Describe one advantage to the consumer of buying products that are assembled using Knock Down Fittings (KDFs). [2]

^{is good}
It is good ~~to~~ buying a product that is assembled using Knock Down Fittings as when something needs taking home the product can be disassembled (taken apart) and taken home ~~then reassembled~~.

- (d) (i) State the correct name of one smart material that you have studied. [1]

Knitinol

- (ii) Describe how the properties of the smart material named above can be used in a specific product. [2]

The properties of Knitinol can be used for trampolines as it can stretch then go back to its original shape/form. It has a memory.

6. This question is about Materials and Components. It is worth a total of 15 marks.

- (a) Metal alloys are a mixture of two or more metals. Correctly match the following alloys to the metals from which they are made. [4]

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Alloy

= Brass ✓
 = Stainless steel ✓
 = Duralumin ✓
 = Bronze ✓

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(c) State the correct name of the two Knock Down Fittings (KDFs) shown below.

[2]

Examiner only
0

(i) Dowel joint



(ii) Nut and bolt

(iii) Describe one advantage to the consumer of buying products that are assembled using Knock Down Fittings (KDFs). [2]

2

^{is good}
It is good for buying a product that is assembled using knock down fittings as when something needs taking home the product can be disassembled (taken apart) and taken home ~~then reassembled~~.

(iv) (i) State the correct name of one smart material that you have studied. [1]

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Knitinol

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13

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- (a) Metal alloys are a mixture of two or more metals. Correctly match the following alloys to the metals from which they are made. [4]

Stainless steel Brass Duralumin Bronze

Metals

Copper (85%) + Zinc (35%)

Steel (72%) + Chrome and Nickel (18%)




Aluminium (95%) + Copper (4%) + Magnesium (1%)

Copper (90%) + Tin (10%)

Alloy

= Brass
= Stainless steel
= Duralumin
= Bronze

- (b) Complete the table by underlining the correct words from each list. (The first product has been completed as an example.) [4]

Product	Material	Classification
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(i) Screw fittings ✓

(ii) Screw in

(iii) Describe one advantage to the consumer of buying products that are assembled using Knock Down Fittings (KDFs). [2]

it is able to be disassembled
unlike glued wood joints

(d) (i) State the correct name of one smart material that you have studied. [1]

Polymerf

(ii) Describe how the properties of the smart material named above can be used in a specific product. [2]

polymerf has a low melting point so can be shaped just by heating in boiling water. this could be used to make custom handles or grips

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Examiner
only
[2] 0



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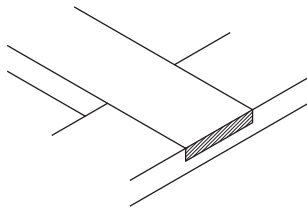
13

8. This question is about ICT, CAD, CAM, Systems and Processes. It is worth a total of 15 marks.

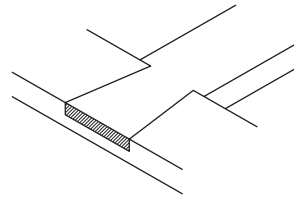
(a) Place **one tick (✓)** for **each** finish to indicate if it is suitable for use on wood or metal or both. [3]

<i>Finish</i>	<i>Wood</i>	<i>Metal</i>	<i>Both</i>
Teak oil			
Plastic coating			
Paint and Primer			

(b) Correctly name the following wood joints. [2]



Name:



Name:

(c) The design of the mould is crucial to the process of vacuum forming. Discuss the features that are required for a high quality vacuum forming mould. [3]

.....

.....

.....

.....

(d) Explain how the use of CAD (Computer Aided Design) can be beneficial when working on a resistant materials project. [3]

.....

.....

.....

.....

(e) The item shown below has been cast in pewter.



Discuss the important factors that would ensure a successful pewter casting. [4]

.....

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.....

.....

.....

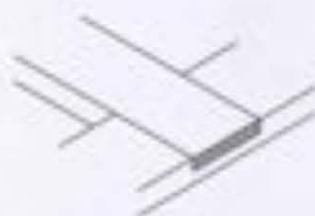
END OF PAPER

8. This question is about ICT, CAD, CAM, Systems and Processes. It is worth a total of 15 marks.

- (a) Place one tick (✓) for each finish to indicate if it is suitable for use on wood or metal or both. [3]

Finish	Wood	Metal	Both
Teak oil	✓		
Plastic coating		✓	
Paint and Primer			✓

- (b) Correctly name the following wood joints. [2]



Name: Slit joint



Name: Angle joint

- (c) The design of the mould is crucial to the process of vacuum forming. Discuss the features that are required for a high quality vacuum forming mould. [3]

Make the mould as accurate to the design as possible, use a material that will resist the heat of the machine and make sure there are no dips or gaps that the machine cannot reach.

- (d) Explain how the use of CAD (Computer Aided Design) can be beneficial when working on a resistant materials project. [3]

It can give you a good representation of the project you want to start and the product you want to design, it can also allow you to spot any faults or problems that may occur.

- (e) The item shown below has been cast in pewter.



Discuss the important factors that would ensure a successful pewter casting. [4]

Smooth sand, so that the mould is
as accurate as possible.

END OF PAPER

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Discuss the important factors that would ensure a successful pewter casting.

[4]

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END OF PAPER

Examiner
only



5

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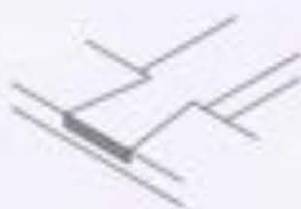
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Finish	Wood	Metal	Both
Teak oil	✓		
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Paint and Primer			✓

- (b) Correctly name the following wood joints. [2]



Name: housing



Name: Dove tail

- (c) The design of the mould is crucial to the process of vacuum forming. Discuss the features that are required for a high quality vacuum forming mould. [3]

~~The plastic needs to be~~ The object ^{shapes} have to be put in safely the plastic needs to be heated just enough then it has to be lower over the mould (e.g chocolate ^{trays} box)

- (d) Explain how the use of CAD (Computer Aided Design) can be beneficial when working on a resistant materials project. [3]

~~to~~ CAD ~~can~~ can be beneficial as ~~pieces~~ pieces or ~~ridge~~ products can be designed sent to a laser cutter and cut mm perfect also you can also engrave designs using the CAD ~~system~~ system.

- (e) The item shown below has been cast in pewter.



Discuss the important factors that would ensure a successful pewter casting.

[4]

The pewter would have to be hot enough so it could flow easily into the mold, the mold would have to not have any holes in because hot pewter could flow out otherwise.

END OF PAPER

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The pewter would have to be hot enough so it could flow easily into the mold, the mold would have to not have any holes in because hot pewter could flow out otherwise.

END OF PAPER



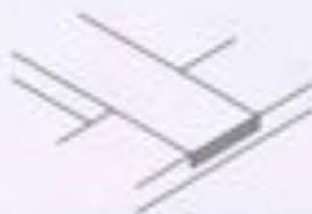
6

8. This question is about ICT, CAD, CAM, Systems and Processes. It is worth a total of 15 marks.

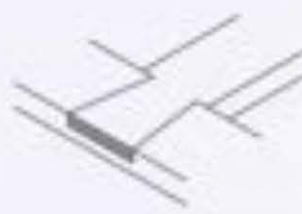
- (a) Place one tick (✓) for each finish to indicate if it is suitable for use on wood or metal or both. [3]

Finish	Wood	Metal	Both
Teak oil	✓		
Plastic coating			✓
Paint and Primer		✓	

- (b) Correctly name the following wood joints. [2]



Name: butt joint



Name: dovetail

- (c) The design of the mould is crucial to the process of vacuum forming. Discuss the features that are required for a high quality vacuum forming mould. [3]

~~needs to have cooling fluid~~
~~moving around to cool the plastic~~ needs
 to have smooth sides to avoid it
 sticking. needs to have at least 90° degree
 angles to get the mold out

- (d) Explain how the use of CAD (Computer Aided Design) can be beneficial when working on a resistant materials project. [3]

you can see how parts fit together
 and if they need to be altered
 you can also test how different
 materials would look

- (e) The item shown below has been cast in pewter.



Discuss the important factors that would ensure a successful pewter casting. [4]

- the pewter is fully melted
- there is no gaps in the moulds edges
- the mould is free from dirt and impurities.

END OF PAPER

8. This question is about ICT, CAD, CAM, Systems and Processes. It is worth a total of 15 marks.

- (a) Place one tick (✓) for each finish to indicate if it is suitable for use on wood or metal or both. [3] 0

Finish	Wood	Metal	Both
Teak oil	✓		
Plastic coating			✓
Paint and Primer		✓	

- (b) Correctly name the following wood joints. [2] 1



Name: butt joint



Name: dovetail

- (c) The design of the mould is crucial to the process of vacuum forming. Discuss the features that are required for a high quality vacuum forming mould. [3] 2

~~needs to have cooling fluid~~
~~moving around to cool the plastic~~ needs
to have smooth sides to avoid it
sticking. needs to have at least 93° degree
angles to get the mold out

- (d) Explain how the use of CAD (Computer Aided Design) can be beneficial when working on a resistant materials project. [3] 1

you can see how parts fit together
and if they need to be altered
you can also test how different
materials would look

(e) The item shown below has been cast in pewter.



Discuss the important factors that would ensure a successful pewter casting.

[4]

0

- the pewter is fully melted
- there is no gaps in the moulds edges
- the mould is free from dirt and impurities.



END OF PAPER

4