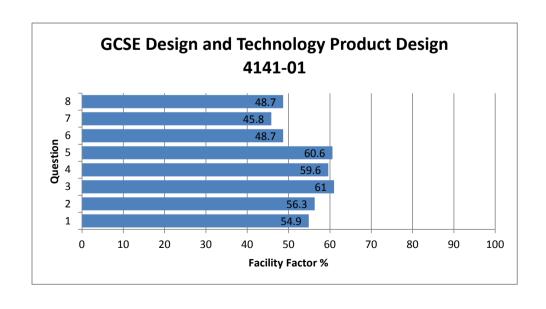


WJEC 2014 Online Exam Review

GCSE Design and Technology Product Design 4141-01

All Candidates' performance across questions

?	?	?	?	?	?	?
Question Title	N	Mean	S D	Max Mark	F F	Attempt %
1	1981	8.2	3.3	15	54.9	99.8
2	1981	5.6	2.3	10	56.3	99.8
3	1981	6.1	2.1	10	61	99.8
4	1981	14.9	4.6	25	59.6	99.8
5	1981	6.1	2.1	10	60.6	99.8
6	1981	7.3	3.1	15	48.7	99.8
7	1981	9.2	3.8	20	45.8	99.8
8	1981	7.3	3.1	15	48.7	99.8



- 6. This question is about Materials and Components. It is worth a total of 15 marks.
 - For **each** of the products shown in the table below **underline** the correct material and the correct classification for the material you have chosen. $4 \times [1]$ An example has been done for you.

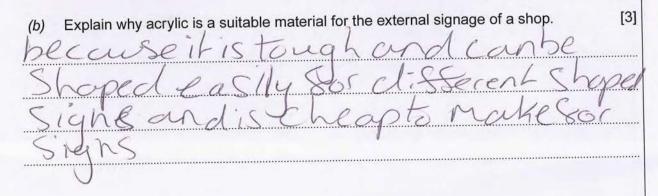
Product	Material	Classification
Water Bottle	HIPs <u>PET</u> HDPE	Thermoplastic Thermosetting Plastic
Torch	Cast Iron Copper Aluminium	Ferrous Metal Non-Ferrous Metal
Display stands	Acrylic Epoxy Resin Melamine Formaldehyde	Thermoplastic Thermosetting Plastic

(b)	Explain why acrylic is a suitable material for the external signage of a shop.	[3]
•••••		•••••
•••••		
		· · · · ·

(c)	(i)	The spoon pictured below has been modified using a smart material. Name the smart material that has been used. [1]
		Name:
	(ii)	Explain the properties of the above named smart material that make it suitable when developing the shape of the spoon handle. [3]
(d)	mod	cribe one advantage and one disadvantage to the designer, when using blue elling foam to create a block model prototype such as the computer mouse model red below. [4]

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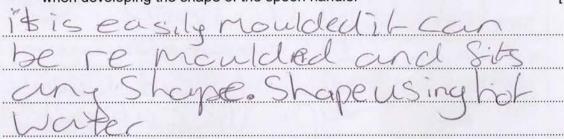
© WJEC CBAC Ltd.

(c) (i) The spoon pictured below has been modified using a smart material. Name the smart material that has been used. [1]



Name: Name:

(ii) Explain the properties of the above named smart material that make it suitable when developing the shape of the spoon handle. [3]



(d) Describe **one** advantage and **one** disadvantage to the designer, when using blue modelling foam to create a block model prototype such as the computer mouse model pictured below.

[4]



Sounis it is easeld mould end Cut and shope The Disadvantage is that I you can't remouldit to change the shape you have to Start dequin

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Product	Material	Classification
	HIPs PET HDPE	Thermoplastic Thermosetting Plastic
Water Bottle		
	Cast Iron Copper Aluminium	Ferrous Metal Non-Ferrous Metal
Torch		
	Acrylic Epoxy Resin Melamine Formaldehyde	Thermoplastic Thermosetting Plastic
Display stands		

(b) Explain why acrylic is a suitable material for the external signage of a shop. [3]

because it is tough and can be

Shaped easily so clisserent shaped

Sign& and is the apto make sor

SignS

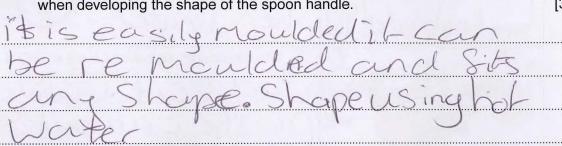
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Examiner only



Name: Name:

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(d) Describe **one** advantage and **one** disadvantage to the designer, when using blue modelling foam to create a block model prototype such as the computer mouse model pictured below. [4]



Educantage of using blue modelling. Soamis it is easely mould end Cut and shope of the Disadvantage is that it you can't remouldit to change the shope you have to Start dequin

2

3



- 6. This question is about Materials and Components. It is worth a total of 15 marks.
 - (a) For **each** of the products shown in the table below **underline** the correct material and the correct classification for the material you have chosen. $4 \times [1]$ An example has been done for you.

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	HIPs PET HDPE	Thermoplastic Thermosetting Plastic
Water Bottle		
Torch	Cast Iron Copper Aluminium	Ferrous Metal Non-Ferrous Metal
	Acrylic Epoxy Resin Melamine Formaldehyde	Thermoplastic Thermosetting Plastic
Display stands		

(b)	Explai	in why	acrylic is	s a suitab	ole mater	ial for the	extern	al signa	ge of a	shop.		[3]
**********	Becau	use	17	15	cheap,	it 13	s ea	sy to	Ch.	ange	1/15	
					and							
					quite							
		<i> </i>		/ Y	20,,,	3	g					

(c) (i) The spoon pictured below has been modified using a smart material. Name the smart material that has been used. [1]



Name: Downplastic

(ii) Explain the properties of the above named smart material that make it suitable when developing the shape of the spoon handle. [3]

**********	it	15	easi	to	MOULD	which	Mak	·es 1	7	
						shope				
********	into									

(d) Describe **one** advantage and **one** disadvantage to the designer, when using blue modelling foam to create a block model prototype such as the computer mouse model pictured below. [4]



One	advant	tage is	phat	it 15	eas	y to	Change
the	54900	06	, L, and	Make	diff	eren	t patterns
			rage is				
			represen			7	
			becouse				

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 An example has been done for you.

Product	Material	Classification
Water Bottle	HIPs PET HDPE	Thermoplastic Thermosetting Plastic
	Cast Iron Copper Aluminium	Ferrous Metal Non-Ferrous Metal
Torch		
Display stands	Acrylic Epoxy Resin Melamine Formaldehyde	Thermoplastic Thermosetting Plastic

recoure	14	15	cheap,	17 13	casy	to ch	nange	1115
	hape	hape and	hape and Maylo	haps and Markly, and	hape and Mould, and you	hape and Markl, and you can do	hape and Mark, and you can do a	Pecause it is cheap, it is easy to change hape and Mould, and you can do a lot it, and it is quite strong

Examine	ı
only	

(c) (i) The spoon pictured below has been modified using a smart material. Name the smart material that has been used.[1]





Name: Darroplastis

(ii) Explain the properties of the above named smart material that make it suitable when developing the shape of the spoon handle. [3]



it is easy to Mould, which Makes it
easier to make into a shape to fit easily
into any hand

(d) Describe **one** advantage and **one** disadvantage to the designer, when using blue modelling foam to create a block model prototype such as the computer mouse model pictured below. [4]





One advantage is that it is easy to change

the Stape of it, and Make different patterns

on it. A disadvantage is that it may not

always be a true representation, and might not

Stow en marks because it is too dark

- 6. This question is about Materials and Components. It is worth a total of 15 marks.
 - (a) For **each** of the products shown in the table below **underline** the correct material and the correct classification for the material you have chosen.

 4 × [1]

 An example has been done for you.

HIPs PET	Thermoplastic
HDPE	Thermosetting Plastic
Cast Iron Copper Aluminium	Ferrous Metal Non-Ferrous Metal
Acrylic Epoxy Resin Melamine Formaldehyde	Thermoplastic Thermosetting Plastic
	Acrylic Epoxy Resin

(b) Explain why acrylic is a suitable material for the external signage of a shop. [3]

Acrylic is suitable a suitable material because

it's hard w so it won't break that

easy it's strong & so it will last about the for a long time

(c) (i) The spoon pictured below has been modified using a smart material. Name the smart material that has been used. [1]



Name: Polyurthane

(ii) Explain the properties of the above named smart material that make it suitable when developing the shape of the spoon handle. [3]

Because it's a solid and a strong material also & because it's proportion of a smart material the spoon handle will not get hot and be will not burn you.

(d) Describe **one** advantage and **one** disadvantage to the designer, when using blue modelling foam to create a block model prototype such as the computer mouse model pictured below.

[4]



An advantage to Using modelling coam is
that it's easy to mowd and so you
could put detail in. A disadvantage is that
it's not very strong so it could break
very easily

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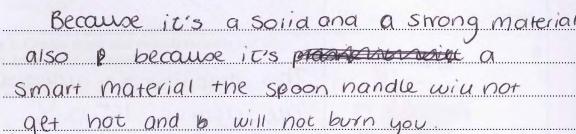
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very easily

- 7. This question is about Tools, Equipment and Making. It is worth a total of 20 marks.
 - (a) Complete the table by inserting the correct name for **each** piece of equipment and describe its use.

Machine/Equipment	Use
A	[2]
Name: [1]	
В	[2]
Name: [1]	
C	[2]
Name: Hot Wire Cutter	

(b)	State three safety precautions you should observe when using machine B pabove.	oictured 3 × [1]
	Precaution 1:	
	Precaution 2:	
	Precaution 3:	

(c) The image below shows an acrylic bottle rack. Use **notes** and **sketches** to describe in detail the main stages for manufacturing the bottle rack. The first stage has been done for you.



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(d)	Explain how testing a prototype before production can impact on the eventual success of a product. [3]	Examiner only
•••••		

- 7. This question is about Tools, Equipment and Making. It is worth a total of 20 marks.
 - (a) Complete the table by inserting the correct name for **each** piece of equipment and describe its use.

Machine/Equipment	Use
Name: tinebender [1]	in certain linesand then bend the plastic [2] when hented
Name: Scroll Saw [1]	Dostic Cut out Shape and a Styn Skwiggly [2]
C	used to cut soom blue voode ling soom polistier alvesclean cut and [2]
Name: Hot Wire Cutter	Can cut any Shope of

(b) State three safety precautions you should observe when using machine B pictured above.

Precaution 1: tie long hair back

Precaution 2: wear safety glasses

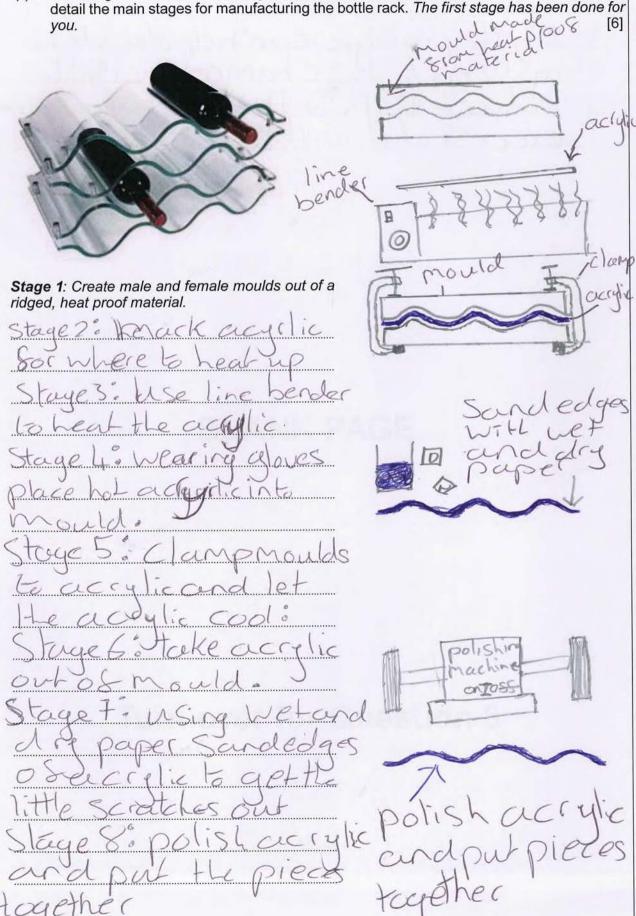
Precaution 3: tack tie in 18 world loose

Clothing in



The image below shows an acrylic bottle rack. Use **notes** and **sketches** to describe in detail the main stages for manufacturing the bottle rack. The first stage has been done for

Examiner only



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Turn over.

(d)	Explain how testing a prototype before production can impact on the eventual success of)TC
	a product.	3]
tes	ting the prototype can help decide is	
	ngsneed to Be changed or istle	
\mathcal{O}	oduct will Sell and how Succes	
S	accessulit will be.	

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(b) State **three** safety precautions you should observe when using machine **B** pictured above. $3 \times [1]$

Precaution 1:

Precaution 2:

Precaution 3:

lothingin

2



Examiner only The image below shows an acrylic bottle rack. Use **notes** and **sketches** to describe in detail the main stages for manufacturing the bottle rack. The first stage has been done for you. (0) Clam Stage 1: Create male and female moulds out of a ridged, heat proof material.

(4141-01)

© WJEC CBAC Ltd.

Turn over.

(d) Explain how testing a prototype before production can impact on the eventual success of a product.

[3]

Peting the prototype can help decide is things need to Be changed or is the product will sell and how sacces

Auccessal its will be a

Examiner only

2



- 7. This question is about Tools, Equipment and Making. It is worth a total of 20 marks.
 - (a) Complete the table by inserting the correct name for **each** piece of equipment and describe its use.

Machine/Equipment	Use
Name: Heat roll [1]	It can heat up a Mili Material to Make it easier to change the shape [2]
Name:	
	It is used to cut Materials Finely such as wood or plastics like acrylic [2]
Name: band 504 [1]	
C	It heats wires to make Hen easier to cut [2]
Name: Hot Wire Cutter	

(b) State **three** safety precautions you should observe when using machine $\bf B$ pictured above. $\bf 3 \times [1]$

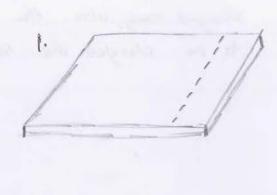
Precaution 1: Protect your hards, keep then for any from the sow

Precaution 2: use protective goggks for any debris

Precaution 3: keep your hair and clothes away from the sam

(c) The image below shows an acrylic bottle rack. Use notes and sketches to describe in detail the main stages for manufacturing the bottle rack. The first stage has been done for you.
[6]





Stage 1: Create male and female moulds out of a ridged, heat proof material.

1. First you have to cut the acrylic to the correct size.



2. Blood Then you have to

Smooth the edges of the

acrylic so they are not rough



3. Then you must bend the acrylic to the correct shape that you want by heating



- 4. Then drill the holes into the acrylic of where you want the fixtures to be
- 5. Finally, you must connect each
 piece of acrylic logether

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to be	changed a	he to	problem	s		
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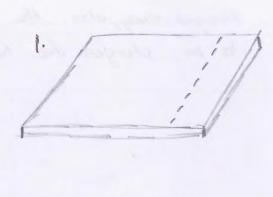
Precaution 2: use protective goggks for any debris

Precaution 3: keep your hair and clothes away from the san

Examiner only

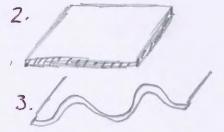
The image below shows an acrylic bottle rack. Use notes and sketches to describe in detail the main stages for manufacturing the bottle rack. The first stage has been done for you.





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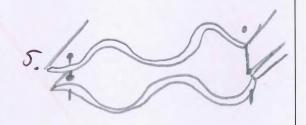
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If any	, problems	are	For	nd,	Ley.	Can	Бе	Cite.	o/
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to be	changed	due	to	proble	Ms.				
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- 7. This question is about Tools, Equipment and Making. It is worth a total of 20 marks.
 - (a) Complete the table by inserting the correct name for **each** piece of equipment and describe its use.

Machine/Equipment	Use
A	It is electrical
	[2]
Name: [1]	Control of the boltomer of the control of the contr
В	This machine is used to cut acrylic. It is electrical [2]
Name: Saw [1]	
C	The This machine is to wire that how been heated up. [2]
Name: Hot Wire Cutter	

(b)	State three safety precautions you should observe when using machine B picture above. $3 \times [1]$
	Precaution 1:
	Precaution 2: Wear go eye protection so acylic doesn+come of
	Precaution 3: Where gloves so you don't burn

(c) The image below shows an acrylic bottle rack. Use notes and sketches to describe in detail the main stages for manufacturing the bottle rack. The first stage has been done for you.
[6]



Stage 1: Create male and female moulds out of a ridged, heat proof material.

3 Stage 2: Then pace acrylic into the Mould to create the Shape (repeat 3 times) Stage 3: You will then Start to create laints to attach the acrylic together, you will Stage 4: Once all the acrylic Sheet's are ready you will have to drill 12 holes into it using a hand arill. 6 hours on each side Stage 5: you will then to test your rack to make Sure its sage and can hold weight. Stage 6° you don't have to give it a finish because its all ready.

a joints
x 12

O drilled holes
x 12

Shand Hand
held
drill

Turn over.

(d) Explain how testing a prototype before production can impact on the eventual success of a product. [3]

Testing a prototype can make a big impact on the Success because if you didn't test it and put the product on the market and Something went Wrong it would be a Controll issue and it could lead to the buissness being sued and the Company Could end up being chosed if it was so a really baderror

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(b)	State three s above.	afety	precautions	you	should	observe	when	using	machine	В	pictured
	above.										3 × [1]

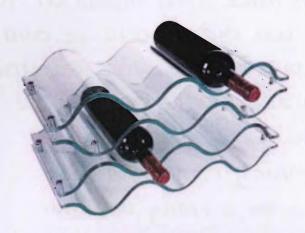
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Ba Joines x 12

O

O drilled hales

hand hand held drill

Turn over.

Examiner only

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(a)	(i)	State the meaning of CAD.	
		Computer A D	
	(ii)	Name one CAD software package that you have used in Product Design.	
	(iii)	Describe two disadvantages of using CAM when developing a prototype.	
		Disadvantage 1:	
	······	Disadvantage 2:	
(b)	The	CAD key ring pictured below has been designed to be manufactured using er.	g a l
	2	Els Edd Dans Blooper Visit Schor Worker Help	
	Abs		
	Aba Select		
	ABC		
	Aba Selection According to the control of the cont		
	And	Layer Layer 1 Layer 1 Layer 1 To Ma	
	And		
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	ibe the pro c sheet.	cess of s	setting up	a lasei c	uller to cut	the design	trom a	1 3 m [
					. 00			
The perfum the advanta					using 3D ra	apid prototy _l	ping. D	
					using 3D ra	apid prototy	ping. D	iscus [:
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					using 3D ra	apid prototy	ping. D	

8.	This	question is about ICT, CAD, CAM, Systems and Processes. It is worth a total of 15 n	narks.
	(a)	(i) State the meaning of CAD.	[2]
		Computer A ! ed D'esign	
		(ii) Name one CAD software package that you have used in Product Design.	[1]
		(iii) Describe two disadvantages of using CAM when developing a prototype.	
		Disadvantage 1:	[2]
		15 one par partis wrong all will be wrong	
		Disadvantage 2:	[2]
		need to know ho wtouseit to use the Sull potential of the pagram	
	(b)	The CAD key ring pictured below has been designed to be manufactured using a cutter.	laser
		As Level Layer 1 - Loo Cal	
		Stuffs Datance Anger	
		(i) Explain why two different coloured lines have been used in the design.	[2]
		Blackline is what is to be cut	
		with the luser catter and red is what will be engraved	

(ii) Describe the process of setting up a laser cutter to cut the design from a 3 mm acrylic sheet. [3]	
the design must be drawn using coroldran	
He laser cutter but must be set to 3 mm	
material must be selected and thickness	
Speed laser must travel at what lines	
Speed laser must travel at what lines Myst be Cut and what is to be engraved and then ready to cut press play to spec, (c) The perfume bottle pictured below was developed using 3D rapid prototyping. Discuss the advantages of using 3D rapid prototyping. [3]	
the advantages of using 3D rapid prototyping. [3]	
it produces exact Size producing 5 D carbo held to	
See is it seels right can also be used with disser	/
Colours can also print disserentshaps and design	s

8.	This	question is about ICT, CAD, CAM, Systems and Processes. It is worth a total of 15 m	4	Examiner only
	(a)	(i) State the meaning of CAD.	[2]	7
		Computer A i ed DeSign		
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		pro desktop		
		(iii) Describe two disadvantages of using CAM when developing a prototype.		
		Disadvantage 1:	[2]	0
		18 one per patis wrong all will		\bigcirc
		be wrong		
		Disadvantage 2:	[2]	1
		need to know ho wtouse it to use		•
		the Sull potential of the program	ne	
	(b)	The CAD key ring pictured below has been designed to be manufactured using a	laser	
		cutter.		
		Ass Lower Layer 1		
		Select object(s)		
		D I		
		and the second s		
		Abb Ref Datance Angle		
			101	0
		(i) Explain why two different coloured lines have been used in the design.	[2]	1
		Black line is what is to be cut with the Justic catter and red is		
		what will be engrowed		

(ii) Describe the process of setting up a laser cutter to cut the design from a 3 mm acrylic sheet.

The design must be drawn using correlation the design must be dearn using correlation the design must be selected and thickness

Speed laser must be selected and thickness

Speed laser must be engraved what is the engraved of the perfume bottle pictured below was developed using 3D rapid prototyping. Discuss the advantages of using 3D rapid prototyping.

[3]

If produces exact size production and selection colours can also print disserted the disserted with disserted and design.

8.	This	questi	ion is about ICT, CAD, CAM, Systems and Processes. It is worth a total of 15	marks.
	(a)	(i)	State the meaning of CAD.	[2]
			Computer A nimated D'esign	
		(ii)	Name one CAD software package that you have used in Product Design. Po desktop	[1]
		(iii)	Describe two disadvantages of using CAM when developing a prototype.	
			Disadvantage 1:	[2]
			You have a 3D model of the design	
			It may not represent the actual size	
			Disadvantage 2:	[2]
			you cannot test bring it because it is	
			not got made	
		D	Fire Lide Course Bitmages View Statup Window Melphonic Mayor I Log Col 100 Miles 100 M	
			Explain why two different coloured lines have been used in the design. Because of different lines represent different	[2]
			Hings, Black My May represent atting thereas ned	
		********	and the state of t	**************

	(ii) Describe acrylic sh	the process of setting up a laser cutter to cut the designeet.	from a 3 mm
		you have to Make a Model shape	
	2D de	sign then you have to insert the 3r	1/7
	3.0	than you have to input what you want	the
	Laser	culter to do-	
(c)		pottle pictured below was developed using 3D rapid prototy s of using 3D rapid prototyping.	yping. Discus: [3
		One advantage is that it is	
	Almai	Another advantage is that it gives	
		a full 3D model of what it will	
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		Disadvantage 1:	[2]	0
		You have a 3D Model of the design		
		It may not represent the actual size		2
		Disadvantage 2:	[2]	0
		you cannot test bring it because it is		
		not got made		
		Seed objects) Seed objects O U O U O M O U O M O M O M O M		
		Abs Rel Datance Angle		
		(i) Explain why two different coloured lines have been used in the design. Because of different lines Deposes to different	[2]	2
		things, Black My May represent atting whereas ned		

		Examiner
	(ii) Describe the process of setting up a laser cutter to cut the design from a 3 mm acrylic sheet.	
	First you have to Make a Model shape on	
	20 design, then you have to insert the 3mm	
	acrylic. Han you have to input what you want the	
	laser cetter to do.	
(c)	The perfume bottle pictured below was developed using 3D rapid prototyping. Discuss the advantages of using 3D rapid prototyping.	2
	One advantage is that it is done	
	quicker than other Manufacturing processes.	
	Another advantage is that it gives you	
	a full 3D model of what it will look	
	like.	



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	Computer A ided Design	
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	(iii) Describe two disadvantages of using CAM when developing a prototype.	
	Disadvantage 1:	
	it's easy man to make a mistake with	1
	the measurments	
	Disadvantage 2:	
	You have no controll over a product	
(b)	Unilst if it was being made by hand would. The CAD key ring pictured below has been designed to be manufactured usin cutter.	1.0.1
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being cut out and one show the engraving

(ii) Describe the process of setting up a laser cutter to cut the design from a 3mm acrylic sheet. [3]

First kning you would do is pick out your acrylic then place it in the machine then you would change the setting on the machine to make sure it's as how it needs to be cut lengraved and then press start.

(c) The perfume bottle pictured below was developed using 3D rapid prototyping. Discuss the advantages of using 3D rapid prototyping. [3]



A. The advantages of using 3D rapid prototyping is that you would be able to analyse what the product would look like from all angles

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(b)	Whilst If it was being made by hand you would. The CAD key ring pictured below has been designed to be manufactured using a cutter.	
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(b)	The CAD key ring pictured below has been designed to be manufactured using a cutter. File Edit Draw Brangs View Setup Window Help Set Edit Draw Brangs Vie	
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(b)	The CAD key ring pictured below has been designed to be manufactured using a cutter. The Manufactured using a cutter. The Manufactured usin	laser
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END OF PAPER

Examiner only