Surname	Centre Number	Candidate Number
Other Names		0

wjec cbac

GCSE

4141/01

S15-4141-01

DESIGN AND TECHNOLOGY

UNIT 1

FOCUS AREA: Product Design

A.M. TUESDAY, 19 May 2015

2 hours

	For Examiner's use only		
	Question	**Maximum Mark**	**Mark Awarded**
Section A	**1.**	**15**	
	2.	**10**	
	3.	**10**	
	4.	**25**	
Section B	**5.**	**10**	
	6.	**15**	
	7.	**20**	
	8.	**15**	
	Total	**120**	

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ADDITIONAL MATERIALS

You will need basic drawing equipment, coloured pencils and a calculator for this examination.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** questions.

Write your answers in the spaces provided in this booklet. Where the space is not sufficient for your answer, continue at the back of the book, taking care to number the continuation correctly.

You are reminded of the necessity for good English and orderly presentation in your answers.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets at the end of each question or part-question.

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Section A

Marked out of 60 *60 minutes*

1. This question is about Product Analysis. It is worth a total of 15 marks.

Study the information below showing a concept model of a transparent toaster.

Product Information:

- Clear panes of heating glass to toast bread.
- Variable heat settings.
- Stainless steel base unit.
- Easy to use dial.

(a) **Underline** the most suitable scale of production for the concept model of a transparent toaster. [1]

One-off Production **Batch Production**

(b) Before starting to design the transparent toaster a specification was written.

Describe what you think were the most important specification points for **each** of the following aspects.

(i) Materials [2]

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(ii) Aesthetics [2]

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(iii) Safety [2]

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(c) (i) Explain how using a transparent material improves the function of the transparent toaster. [2]

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(ii) Discuss **one** difficulty that may be encountered when trialling the transparent toaster. [2]

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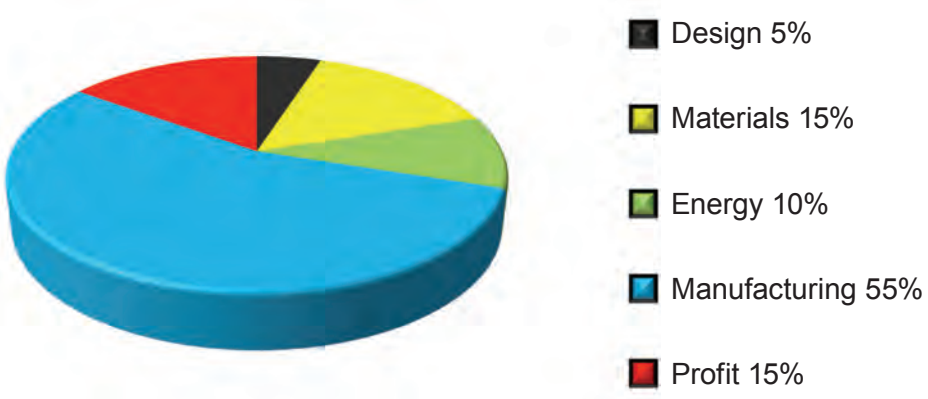
(d) The pie chart below shows a breakdown of the costs that will determine the final selling price of the transparent toaster.



(i) State which area contributes the largest amount to the cost. ..... [1]

(ii) The chart shows that 15% profit will be made for each toaster sold. If the profit made for each transparent toaster is £18, calculate the total selling price. [3]
(Show all your workings.)

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Turn over.

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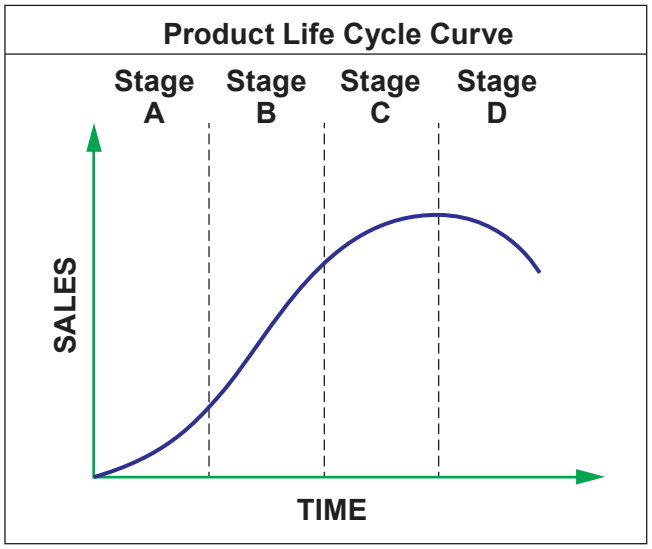
2. This question is about the general issues of Design and Technology. It is worth a total of 10 marks.

(a) The Product Life Cycle Curve below shows the sales of a product at each stage throughout its life cycle.

(i) Complete the table by selecting the correct name for **each** stage of the graph from the list provided below. [3]

Maturity **Decline** **Growth** **Design**



Stage	Name
Stage A	Introduction
Stage B	.....
Stage C	.....
Stage D	.....

(ii) Describe what happens during the **Introduction** stage of a product. [3]

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(b) Discuss how the environmental impact of a product can be reduced by conducting a life cycle analysis exercise during the design of the product. [4]

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3. This question is about the Designers that you have studied. It is worth a total of 10 marks.

During your course you have studied the work of Jonathan Ive and Philippe Starck.

(a) Complete the table below by stating the name of a product that **each** designer is famous for designing.

(i)	Jonathan Ive is famous for designing the	[1]
(ii)	Philippe Starck is famous for designing the	[1]

(b) Write a short essay in the space below that describes Jonathan Ive's work, identifying its main features and discuss what influenced him and how he has influenced other products. [8]

Marks will be awarded for the content of the answer and the quality of written communication.

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4. This question is about the Design Process and how it is used. It is worth a total of 25 marks.

(a) Complete the design process by adding the stages from the list below in the correct order. [3]

Brief and Specification Manufacturing CAD Planning the Making

Design Process
Problem
Research and Analysis
.....
Initial Design Ideas
Development of Chosen Design
Final Design Idea
.....
.....
Evaluation

(b) (i) Describe a method of developing the style and form of a product. [2]

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(ii) Explain how the design specification helps when evaluating the product at the end of the design process. [2]

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(c) Many people are now using tablet computers.

You have been asked to design a portable stand for a tablet computer that can be used in a variety of situations to hold the tablet securely when in use.

The dimensions of the tablet computer are:
Height = 240 mm, Width = 185 mm, Depth = 9 mm.

Specification

The design must:

- be modern, sleek and minimal to match the design of the tablet;
- be free standing and portable;
- show how the tablet will be securely attached to the stand;
- have a way to adjust the angle at which the tablet is held.

Marks will be awarded for:

(i) designing a modern, sleek and minimal stand; [4]

(ii) showing how the stand is free standing and portable; [2]

(iii) showing how the tablet will be attached and how the angle can be adjusted; [4]

(iv) specifying a suitable material and manufacturing process for the stand; [2]

(v) showing **two** overall dimensions for the stand; [2]

(vi) quality of communication. [4]

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Draw your design in the box below.

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Section B

Marked out of 60 *60 minutes*

5. This question is about Commercial Manufacturing Processes. It is worth a total of 10 marks.

(a) Using the words provided, complete the table by placing the correct production scale next to each description. [3]

Batch Production **Mass Production** **One-off Production**

Rapid Prototyping

Description	***Production Scale***
A single item is made specifically to order.	.....
500 identical special edition items are produced.	.....
A large number of identical items are produced using automation.	.....

(b) In industry a production line can be fully automated. Describe **two** benefits for the manufacturer when using this type of production line. 2 × [2]

Benefit 1: .....

.....

Benefit 2: .....

.....

(c) Describe why quality assurance is important when mass producing products. [3]

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

(a) Designers need to consider the properties of **each** material if their product is to be successful.

Complete the table by stating **two** properties for **each** of the materials named. [6]

Material	*Product*	*Properties*
Stainless Steel	 **Kitchen Utensils**	1. ..... 2. .....
ABS	 **Games Console Controller**	1. ..... 2. .....
Carbon-Fibre Reinforced Polymer	 **Snow Boarding Helmet**	1. ..... 2. .....

(b) Describe what a composite material is. [3]

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Turn over.

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(c) Explain why photochromic pigment has been used in the manufacture of the lenses for the cycling sunglasses pictured below. [2]

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(d) Standard components are often bought in to be used in the manufacture of a product. Describe **two** advantages to the manufacturer of using standard components. 2 × [2]

Advantage 1: .....

.....

Advantage 2: .....

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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 describing its use.

Tool/Equipment	*Name*	*Use*
	..... [1]	Use 1: .... Use 2: .... [2]
	..... [1]	Use 1: .... Use 2: .... [2]
	**Vernier Caliper**	Use 1: .... Use 2: .... [2]

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(b) Complete the table below by filling in the missing stages of the vacuum forming process. [4]

Stage No.	*Vacuum Forming Process*
1	Make a mould/former from a heat proof material.
2	
3	
4	Heat the plastic until it becomes malleable.
5	
6	
7	Remove the mould from the formed plastic shape.

(c) Discuss **one** safety precaution to be considered when using the vacuum former. [2]

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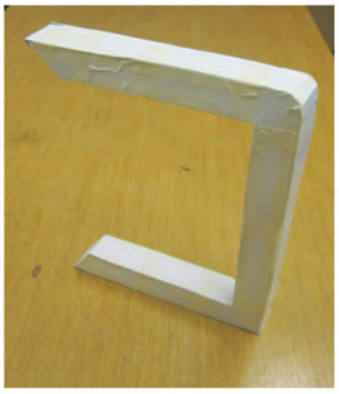
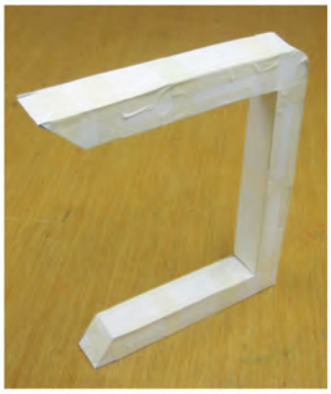
(d) The images below show a cardboard prototype model of a desk lamp. Use labelled sketches to describe in detail the main stages for making the model. [6]





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

(a) (i) State what the letters ICT stand for. [2]

Information C ..... T .....

(ii) Explain how a spreadsheet program can be used to analyse research. [2]

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(iii) State **two** reasons for using the internet to carry out research. [2]

Reason 1:

.....

.....

Reason 2:

.....

.....

(b) The kettle pictured below uses a system to perform its function.

(i) Name **one** input device used in the kettle system. [1]

.....

(ii) Name **one** output device used in the kettle system. [1]

.....

(iii) Feedback is an important feature when controlling systems. Explain how feedback would be used in the kettle system. [2]

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(c) Explain **one** benefit of using CAM to manufacture a prototype. [2]

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(d) Discuss the advantages of using CAM for high volume production. [3]

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END OF PAPER

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