

Surname	Centre Number	Candidate Number
Other Names		0



GCSE

4141/01



DESIGN AND TECHNOLOGY

UNIT 1

FOCUS AREA: Product Design

WEDNESDAY, 23 MAY 2018 – MORNING

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	

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 booklet, 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.

Section A

Marked out of 60 60 minutes

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

The images below show the changes in mobile phone technology.



1997 Mobile Phone

- External aerial
- Single colour screen
- Multi-touch keypad



2016 Mobile Phone

- Built in camera, GPS, Wi-Fi, Apps
- Full colour, 4.7 inch touch screen
- Fingerprint recognition technology

(a) Discuss how the 2016 mobile phone has been changed from the 1997 mobile phone in relation to the following areas.

(i) Size [2]

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(ii) Function [2]

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(iii) Aesthetics [2]

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(b) The casing on the 1997 mobile phone is made from ABS plastic. Explain why this is a suitable material for the casing. [2]

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(c) Explain how new or improved technology has influenced developments of mobile phones in the following areas:

Wireless Connectivity [2]

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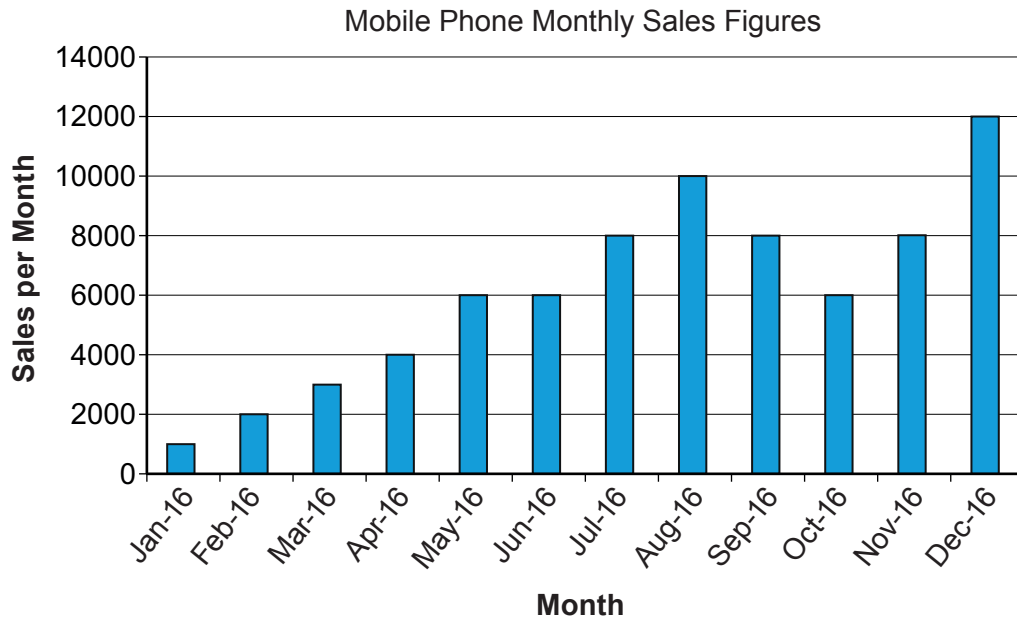
Touch Screen [2]

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(d) The chart below shows monthly sales figures for a mobile phone.



(i) State in which month the most sales were made.

[1]

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(ii) Calculate the mean / average number of sales for the five month period of August to December.
(Show all workings.)

[2]

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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) State the correct R for **each** of the statements below.

(i) Consider an alternative way to make a product more sustainable.

..... [1]

(ii) Reprocess a material to make a new product.

..... [1]

(b) The Energy Star label shown below is an international standard applied to energy efficient products which use 20-30% less energy than the regulation standards.



Explain **one** winner and **one** loser when purchasing products displaying this logo.

Winner:

..... [2]

Loser:

..... [2]

(c) Describe how considering 'Life Cycle Analysis' can give the designer a clear understanding of the environmental impact of a 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 Philippe Starck and James Dyson.

(a) State the name of the designer responsible for the following products. [2]

(i) Axor Vortex tap *Designer:*

(ii) Airblade *Designer:*

(b) Write a short essay in the space below comparing the work of James Dyson and Philippe Starck with reference to the form, function and innovation of their 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 table by inserting the correct design stage for **each** of the descriptions below. *(One example has been done for you.)* 3 × [1]

<i>Description</i>	<i>Design Stage</i>
A number of initial design sketches.	Design Ideas
A list of criteria that the product should meet.	
Gathering useful information for the project.	
Assessing the performance of the finished product.	

(b) (i) Before manufacturing a product, technical details are needed. State **two** important technical details that are needed to manufacture a product effectively.

Technical detail 1: [1]

Technical detail 2: [1]

(ii) Describe the important features that should be included in the plan for manufacture. [2]

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- (c) The images below show a range of everyday household products that have been designed to have a modern and fun style.



Egg Cup



Cork Screw



Citrus Fruit Squeezer

You have been asked to redesign the traditional set of salt and pepper shakers shown below, using a modern and fun style.



Use notes and sketches to present your idea for the salt and pepper shakers in the space provided on the next page.

Specification

The design must:

- be inspired by the modern and fun style of design;
- include a salt and a pepper shaker;
- include a suitable way to dispense the salt and pepper;
- have a suitable way to refill the salt and pepper shakers.

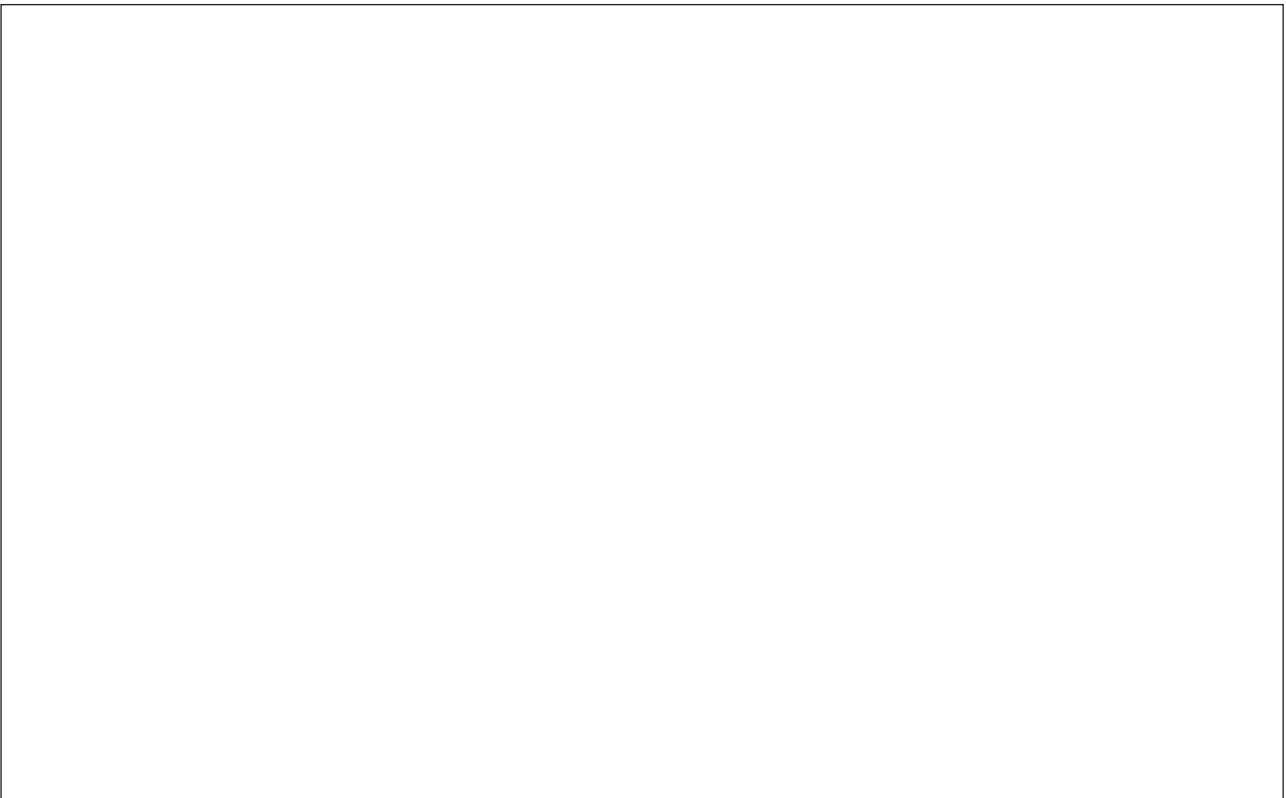
Marks will be awarded for:

- | | |
|-------------------------------------------------------------------|-----|
| (i) reflecting the modern and fun style of design; | [5] |
| (ii) including a suitable way to dispense the salt and pepper; | [2] |
| (iii) a suitable method of refilling the salt and pepper shakers; | [3] |
| (iv) naming and justifying a suitable material; | [2] |
| (v) presenting suitable sizes for the product; | [2] |
| (vi) quality of communication. | [4] |

Draw fully labelled details for the salt and pepper shakers in the box below.



Draw fully labelled details showing how the salt and pepper is dispensed and how the (salt and pepper) shakers are refilled.







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) From the list below, select the correct production method for **each** of the products shown. [4]

- Vacuum Forming Rotational Moulding Blow Moulding
Casting Injection Moulding

<i>Product</i>	<i>Manufacturing Process</i>
Kayak 
Water Bottle 
Blister Packaging 
Toothbrush Handle 

(b) The aluminium chair pictured below was manufactured using press moulding and bending.



Discuss why this is a suitable manufacturing method when producing batches of 1 000 chairs. [3]

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(c) Discuss the advantages to the manufacturer of using rapid prototyping when developing products such as the next generation games console controller shown below. [3]



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

- (a) (i) Complete the table by inserting **each** material listed below under the correct heading. [3]

Corrugated Cardboard Acrylic Parana Pine

<i>Renewable material</i>	<i>Non-Renewable Material</i>
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- (ii) Explain why manufacturers are being encouraged through legislation to use more renewable materials in their products. [2]

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- (b) Study the material properties below and use lines to connect the property with the correct description. [3]

Property	Description
Malleability	The ability to be moulded without breaking.
Ductility	The ability to withstand indentation and scratching.
Hardness	The ability to bend or deform when a force is applied.

- (c) Explain the different properties of thermoplastics and thermosetting plastics. [3]

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(d) Describe what is meant by the term 'standard components' and discuss how using them benefits the manufacturer. [4]

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7. This question is about Tools, Equipment and Making. It is worth a total of 20 marks.

(a) (i) Complete the table by stating the correct name for **each** piece of equipment shown below. [3]

<i>Picture A</i>	<i>Picture B</i>	<i>Picture C</i>
		
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(ii) Describe **one** health and safety precaution when working with the equipment in **Picture A**. [2]

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(iii) Explain what the equipment in **Picture C** is designed to be used for. [2]

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- (b) Study the picture below of a prototype alarm clock that has been modelled using blue modelling foam.



- (i) Complete the table below by filling in the missing stages of the modelling process. [4]

Stage No.	Process
1	Glue 2 pieces of blue foam together to create the required depth.
2	
3	
4	
5	
6	Finish off any rough edges using various grades of glass paper.

- (ii) Discuss the advantages to the designer of using blue modelling foam to create prototypes. [3]

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- (c) The images below show an acrylic and plywood speaker system that has been manufactured in a school workshop using a bought-in speaker kit. Use notes and sketches to describe in detail the main stages for manufacturing the speaker. [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) Place a **tick (✓)** in the table below to match the most suitable software package to the tasks listed. [3]

Task	Spreadsheet	PowerPoint	Word Processor
A written report for a school assignment.			
A slide show displaying a range of design inspiration.			
A breakdown of material costs for your GCSE project.			

- (ii) Give **one** detailed reason for using ICT to present a report that includes pictures and charts. [2]

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- (b) Discuss the benefits to the designer of using 3D Computer Aided Design (CAD) modelling to develop products such as the drill below. [3]



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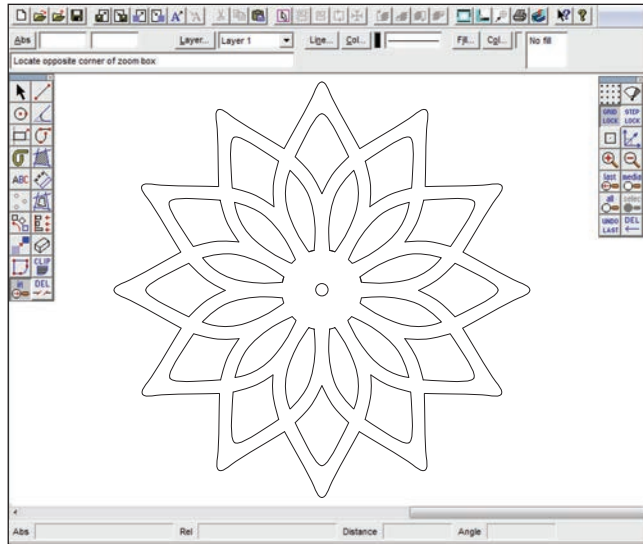
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- (c) Study the images below that show a clock and the Computer Aided Drawing (CAD) that was used to manufacture it.



- (i) Name a suitable CAD package that could be used to produce the drawing of the clock. [1]

- (ii) The CAD design has been created using a repeated pattern to represent the numbers of the clock. Explain how the repeated pattern has been created. [3]

- (iii) Discuss the benefits of using Computer Aided Manufacture (CAM) to manufacture ten clocks. [3]

END OF PAPER

