Surname	Centre Number	Candidate Number
Other Names		0

GCSE

4141/01

S16-4141-01

DESIGN AND TECHNOLOGY
UNIT 1
FOCUS AREA: Product Design

A.M. TUESDAY, 24 May 2016

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 digital television remote control.

Product Information:

- modern curved shape and colour;
- ergonomically placed rubber buttons;
- injection moulded ABS casing;
- rubberised covering on the underneath of the remote;
- programmable for use with TV and receiver.

(a) A design specification was produced before designing the remote control. Write a detailed specification point for **each** of the following headings.

(i) Function [2]

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(ii) Target Market [2]

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(iii) Aesthetics [2]

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(b) (i) The materials used to make the remote control have specific properties that make them suitable. Describe the advantages of the materials used for this product. [3]

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(ii) Explain how the consideration of ergonomics has affected the design of the remote control. [3]

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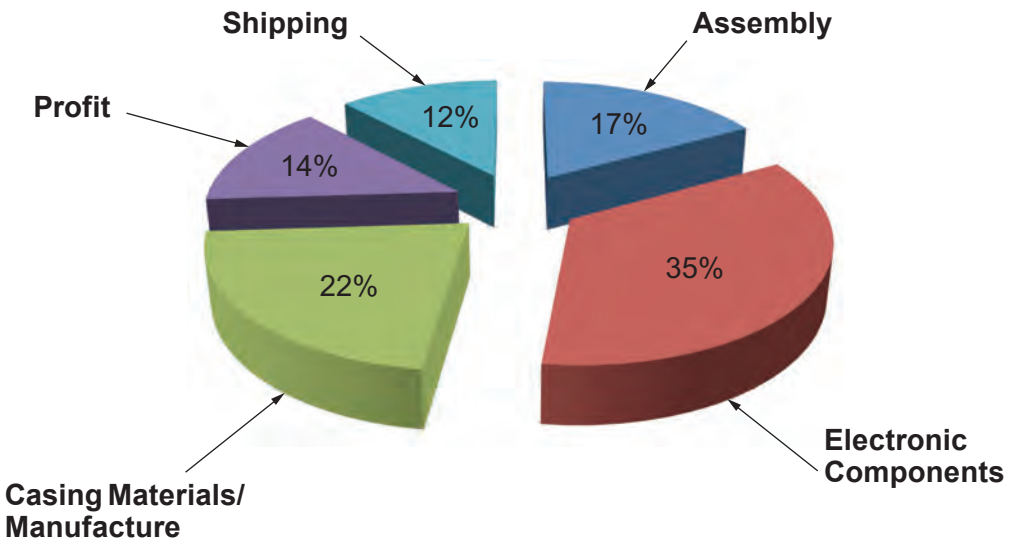
(c) The pie chart below shows the percentages of costs to the manufacturer when bringing the remote control to the marketplace.



(i) State the name of the lowest cost. ..... [1]

(ii) The remote control is sold for £24.99. Calculate how much profit is made if 10 000 remote controls are sold. [2]
(Show all your workings).

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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) (i) Complete the list of the six Rs of sustainability in the table below. [3]

6Rs
Reduce
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Recycle
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Refuse

(ii) Explain how the **Reduce** principle can be used when designing a product to minimise environmental impact. [3]

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(b) Explain in detail what the term 'Product Life Cycle' means. [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 of **each** of the products shown below. [2]

Designer 1: ..... Designer 2: .....

(b) Select **one** of these designers and write a short essay describing his range of work and the impact he has made on the design industry. [8]

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

Name of Designer: .....

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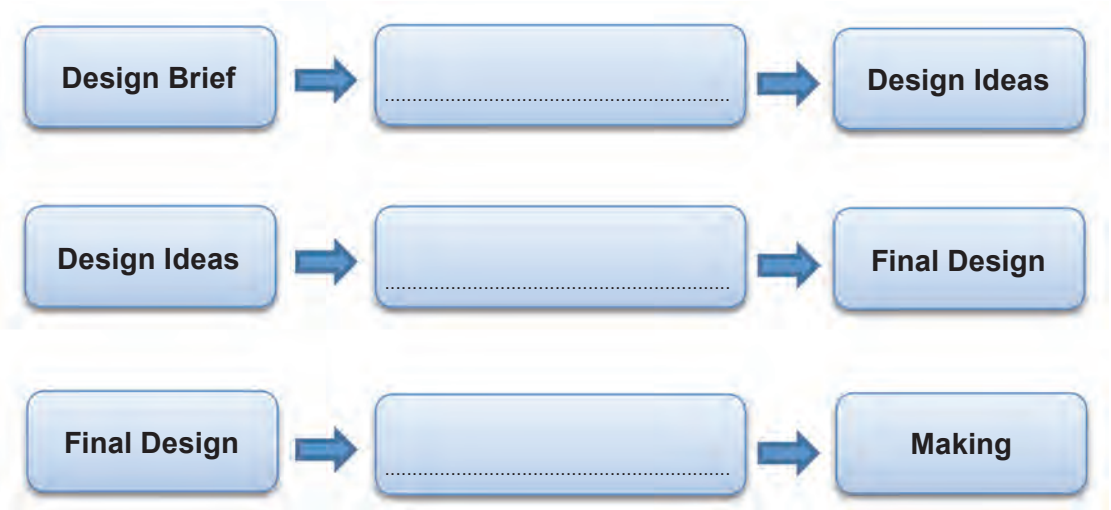
4. This question is about the Design Process and how it is used. It is worth a total of 25 marks.

(a) Using the correct word from the list below, complete the missing stages in the design process.

Planning **Evaluation** **Development** **Specification** 3 x [1]



(b) (i) Describe the importance of carrying out detailed research before designing and making a new product. [2]

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(ii) Describe why designers undertake user trials with prototype products. [2]

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(c) The images below illustrate how modern day perfume bottles have become sculptural works of art where the lid is often a stand out aesthetic feature of the design.

A well-known cosmetics manufacturer is looking to launch a new perfume for both males and females. The name of the new fragrance will be **'Duo'**.

They have asked you to design a new and innovative bottle with a decorative lid and a point of sale display stand to display the new perfume in the retail outlets where it will be sold.

Specification

The design must:

- appeal to both male and female adults;
- have an innovative and ergonomic solution for the bottle;
- have an innovative and aesthetically pleasing lid for the bottle;
- have a point of sale display that enhances and promotes the product.

Marks will be awarded for:

(i) a fully detailed, innovative and ergonomic design solution for the bottle; [4]

(ii) creating an innovative lid for the bottle that adds to the aesthetic appeal; [3]

(iii) a point of sale stand that displays and enhances the bottle; [4]

(iv) suitable sizes, materials and manufacturing processes; [3]

(v) quality of communication. [4]

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Draw fully labelled details for the bottle and lid in the box below.

Draw fully labelled details for the point of sale display stand 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) Select the most suitable scale of production for **each** of the products shown below. [3]

Batch **One-off** **Continuous flow** **Just in time**

Cleaning Products	***Sports Shoes***	***Concept Smartphone***
		
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(b) Discuss **one** advantage to the manufacturer when producing flat packed products. [2]

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(c) Discuss **one** advantage to the customer when purchasing flat packed products. [2]

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(d) Explain the difference between quality assurance and quality control. [3]

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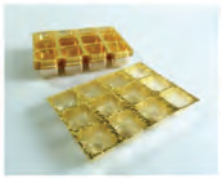
6. This question is about Materials and Components. It is worth a total of 15 marks.

(a) (i) For **each** of the products shown in the table select the correct material and the correct classification from the list below. 6 x [1]

Photochromic Material **Plywood** **PET** **Thermoplastic**

Smart Material **Manufactured Board** **Softwood** **ABS**

Product	***Material***	***Classification***
 Vacuum formed chocolate tray	.....	.....
 Helmet visor that tints in sunlight	.....	.....
 Skateboard deck	.....	.....

(ii) Discuss the mechanical properties of the skateboard deck that make it fit for purpose. [3]

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(b) Plastics are non-renewable materials. Explain what is meant by the term non-renewable. [2]

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(c) The images below show two types of Easter egg packaging.

Packaging A

Cardboard outer packaging with plastic insert

Packaging B

Cardboard only packaging

Explain **two** advantages of using **Packaging B** with respect to environmental issues. [4]

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Examiner only

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

(a) State the correct name for **each** of the tools shown below. 4 x [1]

	
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(b) Explain the importance of **each** of the symbols shown below. 2 x [2]

	
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(c) The prototype lamp pictured below has been made using MDF with a spray painted finish.

(i) Describe **one** safety precaution to be considered when spray painting. [2]

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(ii) Explain in detail the stages that would be required in order to achieve a high quality, spray painted finish on the MDF prototype. [4]

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Turn over.

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(d) The image below shows a pendant that has been manufactured using pewter casting in a school workshop. Use notes and sketches to describe in detail the main stages for manufacturing the pendant. [6]

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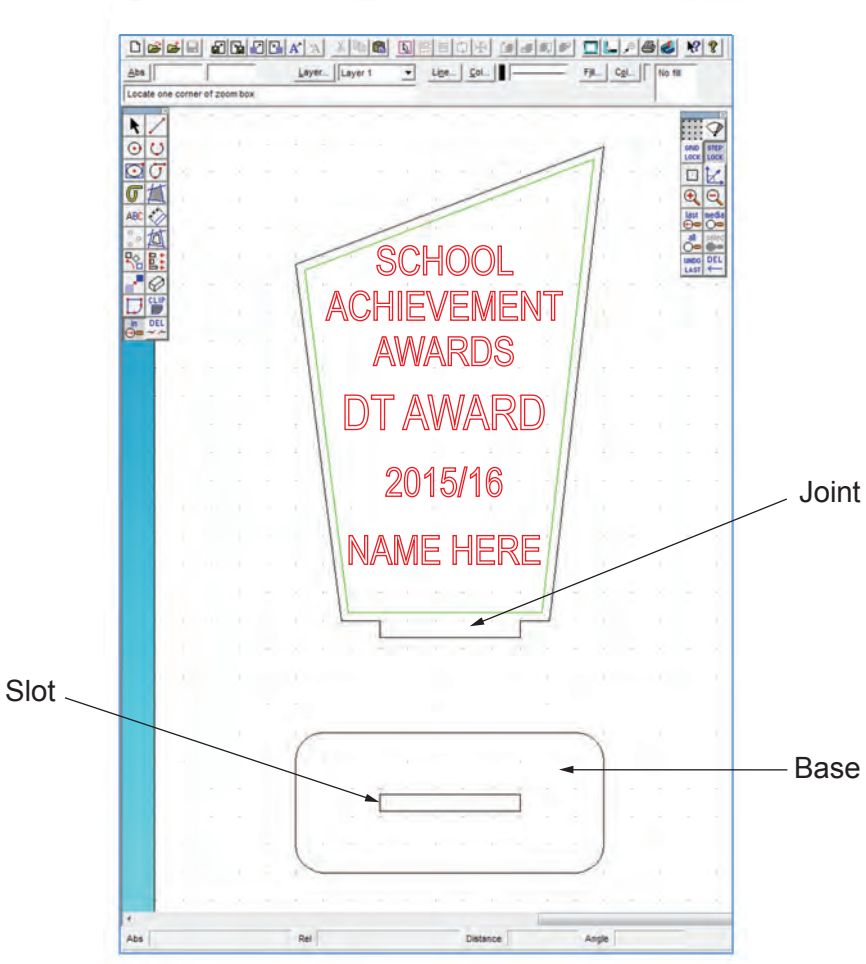
8. This question is about ICT, CAD, CAM, Systems and Processes. It is worth a total of 15 marks.

(a) Place a **tick** (✓) in the table below to match the resource to the correct abbreviated term. [3]

Resource	***ICT***	***CAD***	***CAM***
Laser Cutter			
Drawing Program			
Spreadsheet			

(b) Product design pupils have been asked to design a new trophy for the school awards evening. Below is an image of the chosen design.



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(i) Name **one** software package that could have been used to draw the trophy design. [1]

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(ii) The trophy will be made out of 3 mm acrylic and manufactured using a laser cutter. State what function **each** of the coloured lines will perform.

Black: ..... [1]

Red: ..... [1]

Green: ..... [1]

(iii) When assembling the trophy the joint must fit securely into the slot in the base. Discuss how to ensure that a tight fit is achieved. [2]

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(iv) Discuss the advantages of using a laser cutter to produce 20 trophies. [3]

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(c) Discuss the advantages of using 3D printing when developing a prototype. [3]

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END OF PAPER

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For continuation only.