GCSE

4141/01

DESIGN AND TECHNOLOGY

UNIT 1

FOCUS AREA: Product Design

A.M. TUESDAY, 24 May 2016

2 hours plus your additional time allowance

Surname _____

Other Names _____

Centre Number _____

Candidate Number 0 _____

	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, black ball-point pen or your usual method.

Write your name, centre number and candidate number in the spaces provided on the front cover.

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.

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.**

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 opposite showing a digital television remote control.

(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]

_____

_____

_____

_____

1(a) (ii) Target Market [2]

(iii) Aesthetics [2]

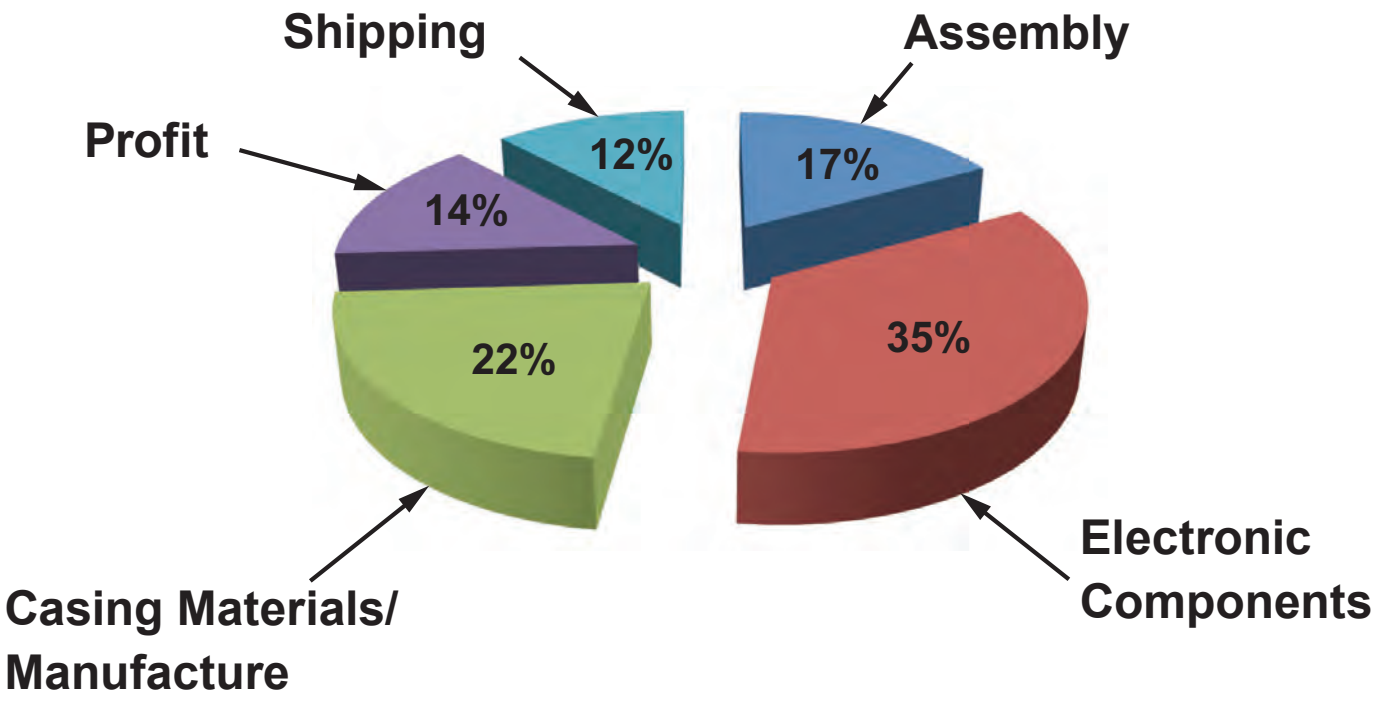
1(b) (i) **The materials used to make the remote control have specific properties that make them suitable. Describe the advantages of the materials used for this product. [3]**

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

1(c) **The pie chart opposite 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).**


Shipping
Assembly
Profit
12%
17%
14%
35%
22%
Electronic
Components
Casing Materials/
Manufacture

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
_____
Recycle
_____
_____
Refuse

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

2(b) Explain in detail what the term 'Product Life Cycle' means. [4]

Designer 1: _____

Designer 2: _____

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 opposite. [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: _____

_____

_____

_____

_____

_____

_____

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 opposite.

PLANNING EVALUATION

DEVELOPMENT SPECIFICATION 3 x [1]

Design Brief	→	_____	→	**Design Ideas**
Design Ideas	→	_____	→	**Final Design**
Final Design	→	_____	→	**Making**

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

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

4(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]**

17

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

18

Draw fully labelled details for the point of sale display stand in the box below.

Cleaning Products	Sports Shoes	Concept Smartphone
		
_____	_____	_____

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 opposite. [3]

BATCH ONE-OFF CONTINUOUS FLOW

JUST IN TIME

(b) Discuss ONE advantage to the manufacturer when producing flat packed products. [2]

_____

_____

_____

_____

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

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

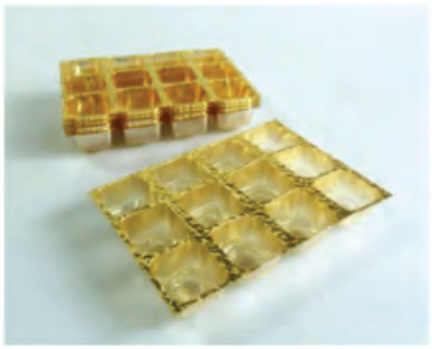
6. This question is about Materials and Components. It is worth a total of 15 marks.

(a) (i) For EACH of the products shown in the table, opposite, 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**		

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

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

Packaging A

Cardboard outer packaging with plastic insert

Packaging B

Cardboard only packaging

6(c) **The images opposite show two types of Easter egg packaging.**

Explain TWO advantages of using PACKAGING B with respect to environmental issues. [4]

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]

	
_____	_____
	
_____	_____

7(b) Explain the importance of EACH of the symbols shown below. 2 x [2]

7(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]

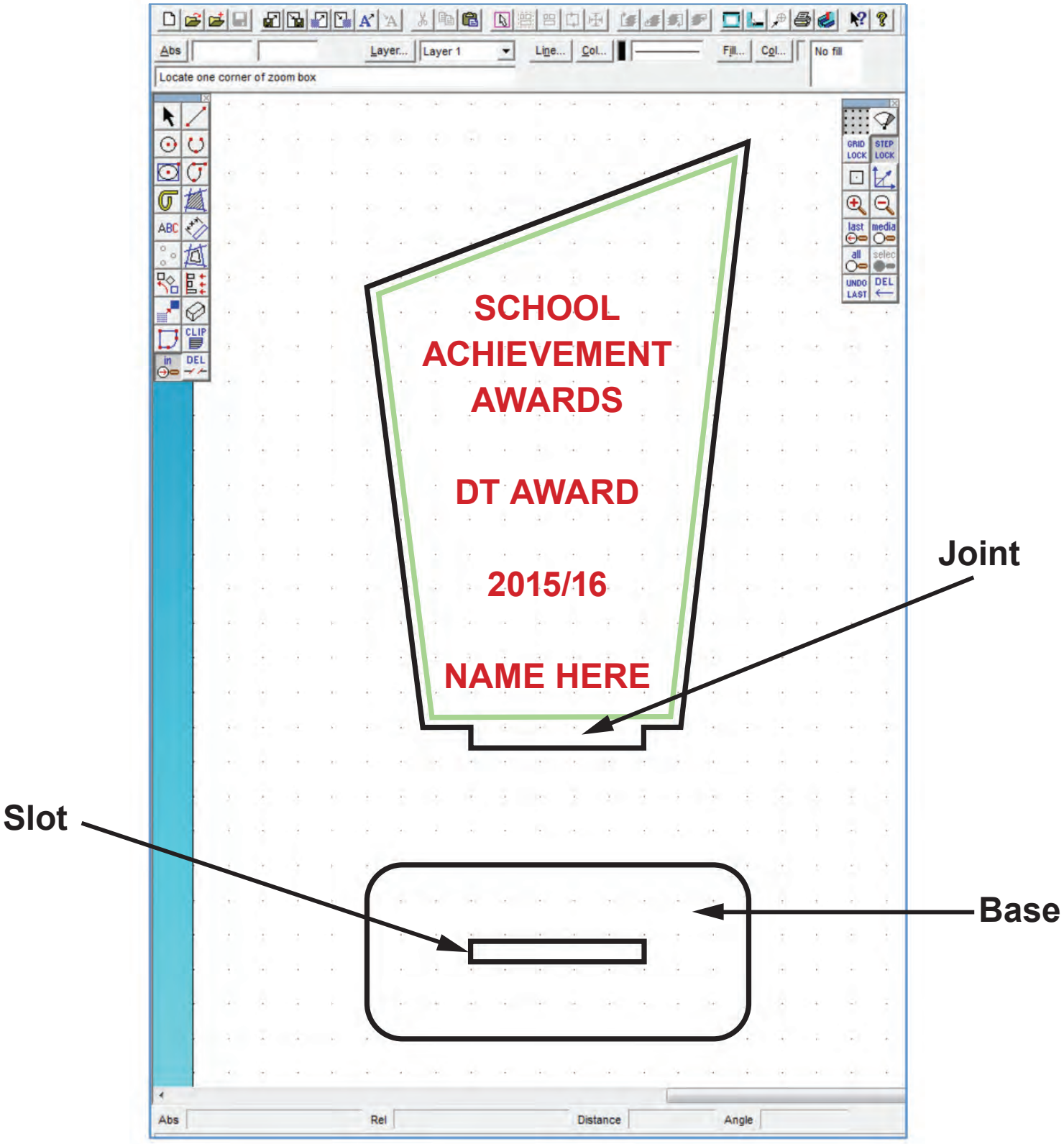
7(c) (ii) Explain in detail the stages that would be required in order to achieve a high quality, spray painted finish on the MDF prototype. [4]

7(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]**

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			


SCHOOL
ACHIEVEMENT
AWARDS
DT AWARD
2015/16
NAME HERE
Joint
Slot
Base

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

(i) Name ONE software package that could have been used to draw the trophy design.

[1]

(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]**

8(b) (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]**

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

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

END OF PAPER

FOR CONTINUATION ONLY.