Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Question	Mark
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
TOTAL	

AQA

General Certificate of Secondary Education
June 2014

Design and Technology: Resistant Materials Technology 45601

Unit 1 Written Paper

Tuesday 10 June 2014 9.00 am to 11.00 am

For this paper you must have:
- a black pen, a pencil, a ruler, an eraser, a pencil sharpener and coloured pencils.

Time allowed
- 2 hours

A

Instructions
- Use black ink or black ball-point pen. Use pencil and coloured pencils only for drawing.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information
- The marks for questions are shown in brackets.
- The maximum mark for this paper is 120.
- The questions in Section A relate to the context referred to in the Preliminary Material that was previously issued.
- You are reminded of the need for good English and clear presentation in your answers. Quality of Written Communication will be assessed in Question 7 (c).

Section A

Answer **all** questions in the spaces provided.

In this section you will be asked to:

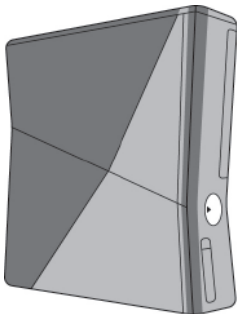
- produce a Design Specification
- produce a range of ideas
- develop **one** of your ideas
- evaluate your chosen idea.

Design Brief

A furniture manufacturer has asked you to produce **five** designs for a games console storage device.

All of your designs must store/hold the console and a selection of games.

Console



Selection of Games

Two of the designs must also store/hold other games equipment such as those shown below.

Steering Controller

Guitar Controller

Game Controller

Question 1 is about the Design Specification.

You are advised to spend about 3 minutes on this question.

1 Give **three** design requirements of a games console storage device.
Explain each of your answers.

An example has been completed for you.

Requirement: The device should protect the games console and other items.
Explanation: This will prevent them getting damaged.

1 (a) Requirement 1

[2 marks]

.....

.....

Explanation

.....

.....

1 (b) Requirement 2

[2 marks]

.....

.....

Explanation

.....

.....

1 (c) Requirement 3

[2 marks]

.....

.....

Explanation

.....

.....

6

Question 2 is about creative design.

You are advised to spend about 20 minutes on this question.

2 Study the information given in the **Design Brief** (page 2) and your **Design Specification** (page 3).

2 (a) Use this information to help you sketch **three** different ideas for a device to store/hold a games console and a selection of games.

Marks will be awarded for creativity.

[3 × 3 marks]

2 (b) Sketch **two** different ideas for a device that will store/hold a games console, a selection of games and other games equipment.

Marks will be awarded for creativity.

[2 × 3 marks]

15

Turn over for the next question

Question 3 is about developing the design.

You are advised to spend about 10 minutes on this question.

3 Choose your best idea from Question 2.

Use notes and sketches to show how you would develop your design.

Marks will be awarded for:

- details of materials and finishes (explain your choices) **[3 marks]**
- constructional details **[3 marks]**
- design features and sizes. **[3 marks]**

9

Question 4 is about evaluation.

You are advised to spend about 3 minutes on this question.

4 Evaluate your developed design from Question 3 against your design requirements from Question 1.

[3 marks]

.....

.....

.....

.....

.....

.....

3

Turn over for the next question

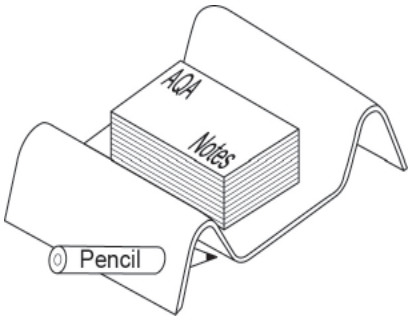
Section B

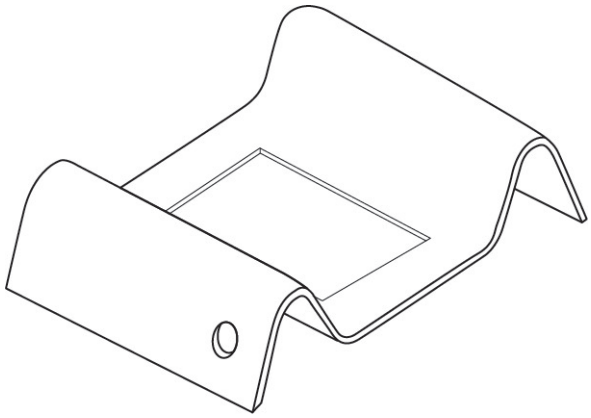
Answer **all** questions in the spaces provided.

Question 5 is about making.

You are advised to spend about 20 minutes on this question.

5 Study the note pad holder shown below.





The note pad holder could be made from wood, metal or plastic.

Select a material for the note pad holder.

Wood ☐

Metal ☐

Plastic ☐

Use notes and sketches to show how you would make a batch of **ten** note pad holders in a school workshop.

At each stage, name **all** the tools, equipment or software you would use.

Stage 1: Marking out **or** CAD (Computer Aided Design)

[4 marks]

Stage 2: Cutting and shaping **or** CAM (Computer Aided Manufacture)

[4 marks]

Stage 3: Bending/forming the note pad holder

[4 marks]

Stage 4: Finishing the note pad holder

[2 marks]

14

Question 6 is about materials.

You are advised to spend about 15 minutes on this question.

6 (a) Complete the table shown below by correctly naming each manufactured board.

Manufactured board	Name
	**[1 mark]** .....
	**[1 mark]** .....

Question 6 continues on the next page

6 (b) Give **three** advantages of using Medium Density Fibreboard (MDF) instead of solid natural timber.

Explain each of your answers.

[2 marks]

6 (b) (i) Advantage: .....

.....

Explanation: .....

.....

[2 marks]

6 (b) (ii) Advantage: .....

.....

Explanation: .....

.....

[2 marks]

6 (b) (iii) Advantage: .....

.....

Explanation: .....

.....

6 (c) Discuss the possible environmental impact of using Medium Density Fibreboard (MDF).

Include information on:

- sourcing the raw material
- the manufacture of the board
- the end of the product's life.

[10 marks]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

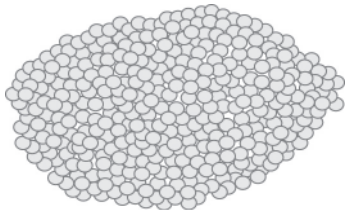
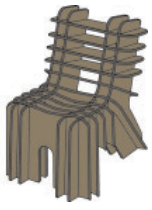
.....

18

Question 7 is about modelling.

You are advised to spend about 20 minutes on this question.

7 (a) Complete the table shown below. Give **two** modelling properties.

Name of Material	Modelling properties	Image
[1 mark]	Easy to cut with scissors. Easy to fold into a 3D object.	
Polymorph (Polycaprolactone)	**[2 marks]**	
Construction kits	**[2 marks]**	
Balsa	**[2 marks]**	
[1 mark]	**[2 marks]**	 

7 (b) Explain why designers make models of their ideas during the design process.

[4 marks]

.....

.....

.....

.....

.....

.....

.....

.....

Question 7 continues on the next page

7 (c) Designers can make use of Computer Aided Design (CAD) software to produce virtual models of their designs.

Explain the advantages and disadvantages of using CAD for virtual modelling instead of traditional modelling techniques.

You will be assessed on Quality of Written Communication in this question.

[8 marks]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

22

Turn over for the next question

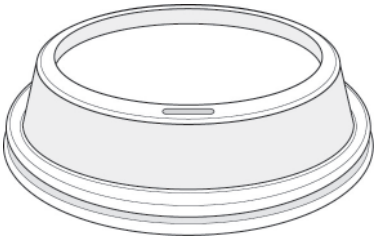
DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED

Question 8 is about quality control, planning and making.

You are advised to spend about 10 minutes on this question.

8 Use the next page to produce a flow chart describing the process of vacuum forming the coffee cup lid shown below.

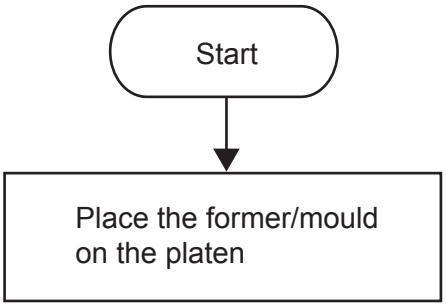
[10 marks]



Include the following symbols at the relevant stages.

Flow Arrow **Terminator** **Process** **Decision**

You may wish to use this space to plan your answer.



10

Question 9 is about 'market-pull' and 'technology-push'.

You are advised to spend about 5 minutes on this question.

9 (a) Identify which of the following correctly describes "market-pull".

[1 mark]

Description	Tick
There is a public demand for a product to be designed and made	
A material that has a high tensile strength	
An entrance to a shopping centre	

9 (b) Identify which of the following correctly describes "technology-push".

[1 mark]

Description	Tick
Old products are made obsolete	
Advances in technology enable new products to be designed and made	
A material that has a high compressive strength	

9 (c) On the diagram below, use straight lines to link the products to the most suitable category.

[5 marks]

Products	Categories
Microwave oven	
Self-cleaning glass	Market-pull
The latest mobile phone	
Car booster seat	Technology-push
Wind up radio	

7

Question 10 is about maintenance.

You are advised to spend about 14 minutes on this question.

10 The image below is an electronic toothbrush and charger.

10 (a) Identify and describe **two** features of the electronic toothbrush that show that the designer has thought about product maintenance.

[4 marks]

Feature 1: .....

Description: .....

.....

Feature 2: .....

Description: .....

.....

Question 10 continues on the next page

10 (b) Explain why it is important for a designer to think about maintenance when designing products.

[4 marks]

.....

.....

.....

.....

.....

.....

.....

.....

10 (c) Explain why the designer has used Acrylonitrile Butadiene Styrene (ABS) plastic in the manufacture of the toothbrush.

[4 marks]

.....

.....

.....

.....

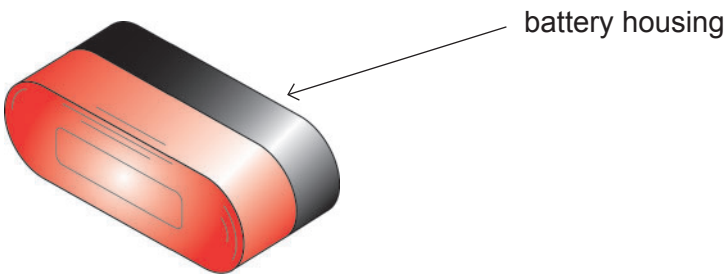
.....

.....

.....

.....

10 (d) Study the drawing of the bicycle light shown below.



Use notes and sketches to show **one** feature the designer could have used to make it easy to change the batteries.

[4 marks]

16

END OF QUESTIONS

There are no questions printed on this page

DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED

Acknowledgement of copyright-holders and publishers

Permission to reproduce all copyright material has been applied for. In some cases, efforts to contact copyright-holders have been unsuccessful and AQA will be happy to rectify any omissions of acknowledgements in future papers if notified.

Question 7: © Thinkstock
Question 8: © Thinkstock
Question 10: © Thinkstock