AQA

Please write clearly in block capitals.

Centre number | | | | | | Candidate number | | | | |

Surname _____

Forename(s) _____

Candidate signature _____

AS

DESIGN AND TECHNOLOGY: PRODUCT DESIGN (3-D DESIGN)

Unit 1 Materials, Components and Application

Monday 23 May 2016 Morning Time allowed: 2 hours

Materials
For this paper you must have:
- normal writing and drawing instruments.

Instructions
- Use black ink or black ball-point pen. Use pencil only for drawing.
- Fill in the boxes at the top of this page.
- Answer **all** questions in Section A.
- Answer **one** question from Section B, **either** Question 5 **or** Question 6.
- Answer the question in Section C.
- 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 that you do not want to be marked.

Information
- The marks for questions are shown in brackets.
- The maximum mark for this paper is 80.
- There are 20 marks for Section A, 20 marks for Section B and 40 marks for Section C.

Advice
- Illustrate your answers with sketches and/or diagrams wherever you feel it is appropriate.
- You are advised to spend approximately 30 minutes on section A, 30 minutes on Section B and one hour on Section C.

Section A

Answer **all** questions in this section.

1 For **each** of the products shown below, put the correct letter in the box to show the most appropriate manufacturing process.

[4 marks]

A CNC plotter cutter

B Blow moulding

C Vacuum forming

D Injection moulding

E 3D printing

Product	**Manufacturing process**
Polyethylene Terephthalate (PET) fizzy drink bottle	
Vinyl lettering for a sign	
Polylactic acid (PLA) prototype of a design	
Polypropylene (PP) yoghurt pot	

4

2 (a) What is meant by the term 'alloy'?

[2 marks]

_____

_____

_____

_____

2 (b) (i) Name a specific alloy. Give an application for this alloy.

[2 marks]

Alloy _____

Application _____

_____

2 (b) (ii) Explain why this alloy is suitable for the application you have named in part (b)(i).

[2 marks]

_____

_____

_____

_____

6

Turn over for the next question

3 State the meaning of the following symbols.

[4 x 1 mark]

Meaning _____

Meaning _____

Meaning _____

Meaning _____

4

4 (a) Low Density Polyethylene (LDPE) and Acrylonitrile Butadiene Styrene (ABS) are examples of what classification of polymer?

[1 mark]

_____

4 (b) Give an application for **one** of the materials named in part (a).

[1 mark]

Material _____

Application _____

4 (c) Give **two** reasons to explain why this material is suitable for the application you have given in part (b).

[2 x 2 marks]

Reason 1 _____

_____

_____

_____

Reason 2 _____

_____

_____

_____

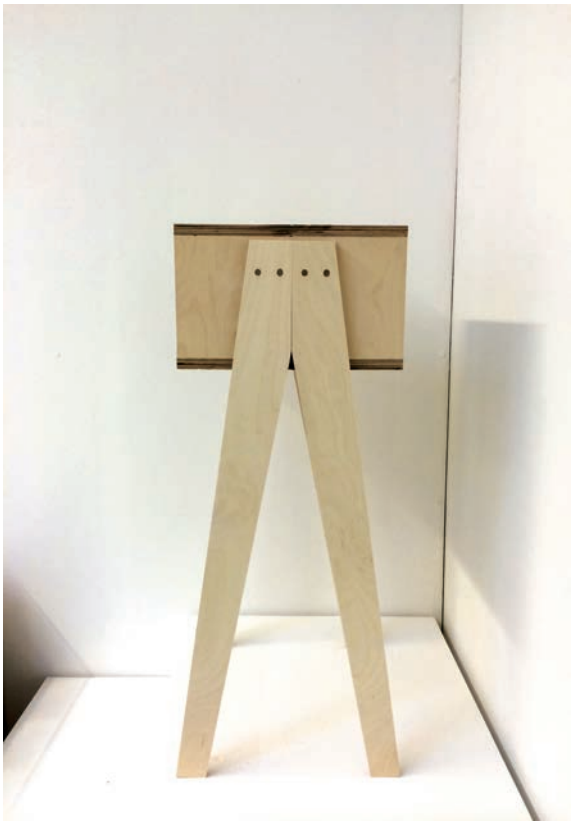
6

Turn over for the next question

Section B

Answer **either** Question 5 **or** Question 6.

5 The photographs show a table made from a man-made board.



5 (a) (i) Name a specific man-made board suitable for the table.

[1 mark]

5 (a) (ii) Explain in detail why the man-made board you have named in part (a)(i) is suitable for the table.

[6 marks]

Question 5 continues on the next page

5 (a) (iii) Use notes and diagrams to describe the most appropriate method for manufacturing the component parts and assembling the whole table.

[9 marks]

Question 5 continues on the next page

5 (b) Describe the advantages of flat pack furniture over ready assembled furniture.

[4 marks]

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20

Turn over for the next question

DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED

Do not answer this question if you have answered Question 5.

6 (a) For each of the following materials, explain in detail why the material is suitable for the product.

In your answer you may wish to consider manufacture, function and aesthetics.

Material	Product
(i) High Density Polyethylene (HDPE)	Shampoo bottle
(ii) Corrugated card	Take away pizza box

6 (a) (i) High Density Polyethylene (HDPE) – Shampoo bottle

[8 marks]

6 (a) (ii) Corrugated card – Take away pizza box

[8 marks]

6 (b) The symbol below is sometimes printed on materials and products.

6 (b) (i) What do the letters FSC stand for?

[1 mark]

_____

_____

6 (b) (ii) Give reasons why this symbol is used.

[3 marks]

_____

_____

_____

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_____

_____

20

Turn over for the next question

Section C

You **must** answer this question.

7 The photographs show an electric kettle. The body of the kettle is made from a metal.

7 (a) (i) Name a specific metal suitable for making the body of the kettle.

[1 mark]

7 (a) (ii) Explain in detail why the metal you have named in part (a)(i) is suitable for the body of the kettle.

[6 marks]

Question 7 continues on the next page

7 (a) (iii) The metal body of the kettle could have been manufactured using the spinning process.

Use notes and diagrams to describe the spinning process.

[7 marks]

Question 7 continues on the next page

7 (b) Use notes and diagrams to critically evaluate the ergonomic and safety aspects of the kettle shown on page 16.

[12 marks]

Question 7 continues on the next page

7 (c) The photograph shows a UK mains electrical plug socket.

7 (c) (i) The plug socket has been made from Urea Formaldehyde.

Explain in detail why Urea Formaldehyde is suitable for the plug socket.

[4 marks]

7 (c) (ii) The plug socket could have been manufactured by compression moulding.

Use notes and diagrams to describe the process of compression moulding.

[7 marks]

Question 7 continues on the next page

7 (c) (iii) Discuss the environmental issues associated with the use of polymers such as Urea Formaldehyde.

[3 marks]

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40

END OF QUESTIONS