

Please write clearly in block capitals.

Centre number

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Candidate number

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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 AAnswer **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



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

Turn over ►



3 State the meaning of the following symbols.

[4 x 1 mark]



Meaning _____



Meaning _____



Meaning _____



Meaning _____



- 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

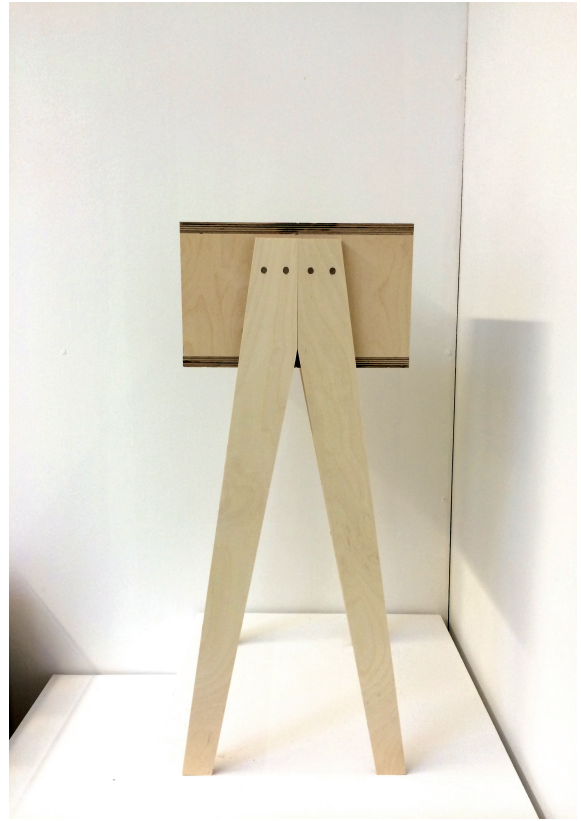
Turn over ►



Section B

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

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



[1 mark]

[6 marks]

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and extend across the width of the page. There are no margins, text, or other markings on the paper.

Turn over ►



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

Turn over ►



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

[4 marks]

20



Turn over for the next question

**DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED**

Turn over ►



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



[8 marks]

[illegible]

[8 marks]

[illegible]

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]

20

Turn over for the next question

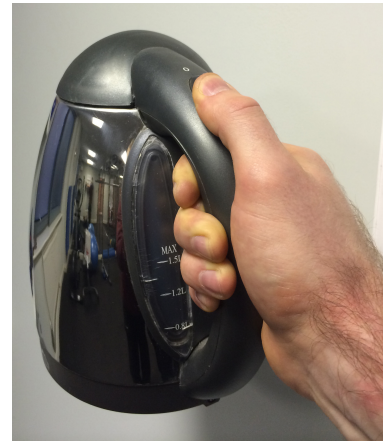
Turn over ►



Section C

You **must** answer this question.

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



[1 mark]

[6 marks]

[illegible]

Turn over ►



[7 marks]

[illegible]

Question 7 continues on the next page

Turn over ►



- 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

Turn over ►



- 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

Turn over ►



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

[3 marks]

40

END OF QUESTIONS

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