

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	
TOTAL	



General Certificate of Education
Advanced Subsidiary Examination
June 2013

Design and Technology: Product Design (3-D Design)

PROD1

Unit 1 Materials, Components and Application

Tuesday 14 May 2013 9.00 am to 11.00 am

For this paper you must have:

- normal writing and drawing instruments

Time allowed

- 2 hours

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 Question 7 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.
- You will be marked on your ability to:
 - use good English
 - organise information clearly
 - use specialist vocabulary where appropriate.

Advice

- Illustrate your answers with sketches and/or diagrams where appropriate.
- You are advised to spend approximately 30 minutes on Section A, 30 minutes on Section B and one hour on Section C.



J U N 1 3 P R O D 1 0 1

M/Jun13/PROD1

PROD1

Section A

Answer **all** of the questions in this section.

1 (a) To which group of polymers do Polylactide (PLA) and Biopol belong?

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.....

(1 mark)

1 (b) (i) Give an application for **one** of the polymers named in part (a).

Polymer.....

Application

(1 mark)

1 (b) (ii) Give **two** reasons to explain why this polymer is suitable for the application you have given.

Reason 1

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Reason 2

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(2 × 2 marks)

6



2 (a) Thermo-chromic sheet and shape memory alloy (SMA) are examples of what type of material?

.....
(1 mark)

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

Material

Application
(1 mark)

2 (b) (ii) Give **two** reasons to explain why this material is suitable for the application you have given.

Reason 1
.....
.....

Reason 2
.....
.....

(2 × 2 marks)

6

Turn over for the next question

Turn over ▶



3 (a) Place the following metals into the correct classification.

You should tick the correct box in each case.

	Ferrous	Non-ferrous
• Aluminium	<input type="checkbox"/>	<input type="checkbox"/>
• Titanium	<input type="checkbox"/>	<input type="checkbox"/>
• Stainless Steel	<input type="checkbox"/>	<input type="checkbox"/>
• Brass	<input type="checkbox"/>	<input type="checkbox"/>

(4 marks)

3 (b) Give an application for **one** of the metals listed in part (a).

Metal

Application

.....

(1 mark)

5



4 (a) Name a substance that might be labelled with **either** of the Control of Substances Hazardous to Health (COSHH) symbols shown below.



..... (1 mark)

4 (b) For the substance you have named in part (a) describe a precaution that would be taken to comply with COSHH regulations.

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..... (2 marks)

Turn over for the next question

3

Turn over ▶



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ANSWER IN THE SPACES PROVIDED**



Section B

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

5 (a) The high chair pictured below is made from polypropylene.
Explain why this polymer is suitable.



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(6 marks)

Turn over ▶



5 (b) The body of the chair has been rotationally moulded. Use notes and diagrams to describe this process.

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(10 marks)

Question 5 continues on the next page

Turn over ▶



5 (c) Give **two** reasons to explain why rotational moulding is suitable for this application.

Reason 1

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Reason 2

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(2 × 2 marks)

20



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

- 6 (a)** For **each** of the following materials, give **four** reasons why it is suitable for the product. In your answer you may wish to consider manufacture, function and aesthetics.

Material	Product
(i) Pine	Interior furniture
(ii) Metal effects card	Gift boxes

Question 6 continues on the next page

Turn over ▶



6 (b) Name an alternative compliant material that can be used to manufacture gift boxes.
Explain why this material is suitable.

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(4 marks)

20



Section C

You **must** answer this question.

7 The photographs below show a soap dispenser and sink.



7 (a) (i) Name a specific polymer suitable for the soap dispenser.

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(1 mark)

7 (a) (ii) Explain in detail why the polymer you have named is suitable for the soap dispenser.

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(6 marks)

Turn over ▶



7 (a) (iii) The soap dispenser has been made from several parts that have been injection moulded.

Use notes and diagrams to describe this process.

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(8 marks)



Question 7 continues on the next page

(8 marks)

Turn over ▶



7 (c) The soap dispenser and sink are intended to be used by children aged 3 to 6 years.

Use notes and sketches to show how the soap dispenser and sink could be further developed to make them easier to use and to encourage children to wash their hands.

Your notes and sketches should consider the following:

- how children might be encouraged to wash their hands
- specific ergonomic features that will make it easier to operate the soap dispenser and sink taps.



(10 marks)

END OF QUESTIONS

40



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