

Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Question	Mark
1	
2	
3	
4	
5	
6	
TOTAL	



General Certificate of Education
Advanced Subsidiary Examination
June 2010

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

PROD1

Unit 1 Materials, Components and Application

Friday 28 May 2010 9.00 am to 11.00 am

For this paper you must have:

- normal writing and drawing instruments
- a colour Insert Sheet (enclosed).

Time allowed

- 2 hours

Instructions

- Use black ink or black ball-point pen. Use pencil and coloured pencils 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 4 **or** Question 5.
- 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 where 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.



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

M/Jun10/PROD1

PROD1

Section AAnswer **all** questions in this section.

- 1 (a) Name **three** ferrous and **three** non-ferrous metals by completing the table below.

Ferrous metals			
Non-ferrous metals			

(6 marks)

- 1 (b) (i) For **one** of the metals you have named in part (a) give a suitable use.

Metal

Use

(1 mark)

- 1 (b) (ii) Give **two** reasons why this metal is suitable.

Reason 1

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Reason 2

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(2 marks)



2 (a) Name **one** man-made board and give a use for it.

Name (1 mark)

Use.....
..... (1 mark)

2 (b) Describe **three** advantages that man-made boards have over natural woods.

1.....
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2.....
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3.....
..... (3 marks)

2 (c) The logo shown below is sometimes printed on timber.
Explain the meaning of this logo.



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..... (2 marks)

7

Turn over ▶



3 Match each of the following compliant materials to the correct application in the table below.

- Layout paper
- Extruded polystyrene foam (styrofoam)
- Acetate
- Bleed proof paper

You must only use each compliant material once.

Application	Modelling	Design sketching	Marker rendering	Retail packaging with a clear window for display
Compliant material				

(4 marks)

4



Section B

Answer **either** Question 4 **or** Question 5.

4 For each of the following materials, describe **two** relevant properties and, in each case, give a reason why it is useful for the product listed. Your answer should make reference to:

- product function
- product aesthetics
- product manufacture.

Material	Product
(a) Carbon Fibre Reinforced Polymer (CFRP)	Tennis racquet
(b) Concrete	Garden ornament
(c) Liquid Silicon Rubber (LSR)	Mobile phone cover/skin
(d) Beech	Chopping board
(e) Titanium	Wrist watch strap and casing

4 (a) Carbon Fibre Reinforced Polymer (Tennis racquet)

Property

Relevance to product

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Property

Relevance to product

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Question 4 continues on the next page

(4 marks)

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4 (b) Concrete (Garden ornament)

Property

Relevance to product

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Property

Relevance to product

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(4 marks)



4 (c) Liquid Silicon Rubber (Mobile phone cover/skin)

Property

Relevance to product

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Property

Relevance to product

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(4 marks)

Question 4 continues on the next page

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4 (d) Beech (Chopping board)

Property

Relevance to product

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Property

Relevance to product.....

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(4 marks)



4 (e) Titanium (Wrist watch strap and casing)

Property

Relevance to product

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Property

Relevance to product

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(4 marks)

20

Turn over ▶



There are no questions printed on this page

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



Do **not** answer Question 5 if you have answered Question 4

5 Study the photograph of the washing liquid bottle (**Figure 1**) on the Insert Sheet. It is made from Low Density Polyethylene (LDPE) which has been extrusion blow moulded.

5 (a) Briefly explain **three** reasons why LDPE is a suitable material for this product.

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(6 marks)

Question 5 continues on the next page

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5 (b) Use notes and diagrams to describe the extrusion blow moulding process.
You may use the space opposite for diagrams.

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A large empty rectangular box for writing answers.

(10 marks)

Question 5 continues on the next page

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5 (c) Explain why extrusion blow moulding is a suitable process for making the washing liquid bottle.
You should give **two** reasons in your answer.

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(4 marks)

20



Section C

Answer this question.

6 Study the photographs of the Thermos® cup (**Figures 2 to 5**) on the Insert Sheet and answer the following questions.

6 (a) (i) Name a suitable specific metal for part A of the cup.

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(1 mark)

6 (a) (ii) Briefly explain **three** reasons why this metal is suitable.

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(6 marks)

Question 6 continues on the next page

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6 (a) (iii) Use notes and diagrams to explain how the metal part A could be manufactured.
There is space opposite which you may use for diagrams.

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(10 marks)

Question 6 continues on the next page

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6 (b) Critically evaluate the ergonomic and safety features of the cup, making suggestions for modifications where necessary. Use diagrams to support your answer. You may use the space below and over the page for diagrams.

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Turn over ▶



(16 marks)

40

END OF QUESTIONS

