Centre Number			Candidate Number		
Surname					
Other Names					
Candidate Signature					



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

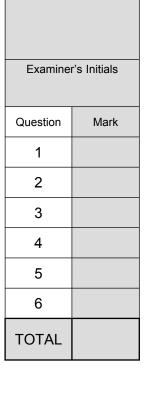
- Use black ink or black ball-point pen. Use pencil and coloured pencils for drawing.
- Fill in the boxes at the top of this page.
- Answer **all** questions in Section A.
- Answer **one** question from Section B, **either** Question 4 **or** Question 5.
- Answer the question in Section C.
- You must 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.



For Examiner's Use

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	Section A						
		Answer 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 us	e.				
		Metal					
		Use					
			(1 mark)				
1	(b) (ii)	Give two reasons why this metal is suitable.					
		Reason 1					
		Reason 2					
			(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	
		2	
		3	
			(3 marks)
2	(c)	The logo shown below is sometimes printed on timber. Explain the meaning of this logo.	
		FSC	
			(2 marks)



- 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.

- 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
		Property
		Relevance to product
		/4 J - \
		Question 4 continues on the next nage (4 marks)



4	(b)	Concrete (Garden ornament)
		Property
		Relevance to product
		Property
		Relevance to product
		(4 marks)



4	(c)	Liquid Silicon Rubber (Mobile phone cover/skin)
		Property
		Relevance to product
		Property
		Relevance to product
		(4 marks)

Question 4 continues on the next page



4	(d)	Beech (Chopping board)
		Property
		Relevance to product
		Property
		Relevance to product
		(4 marks)

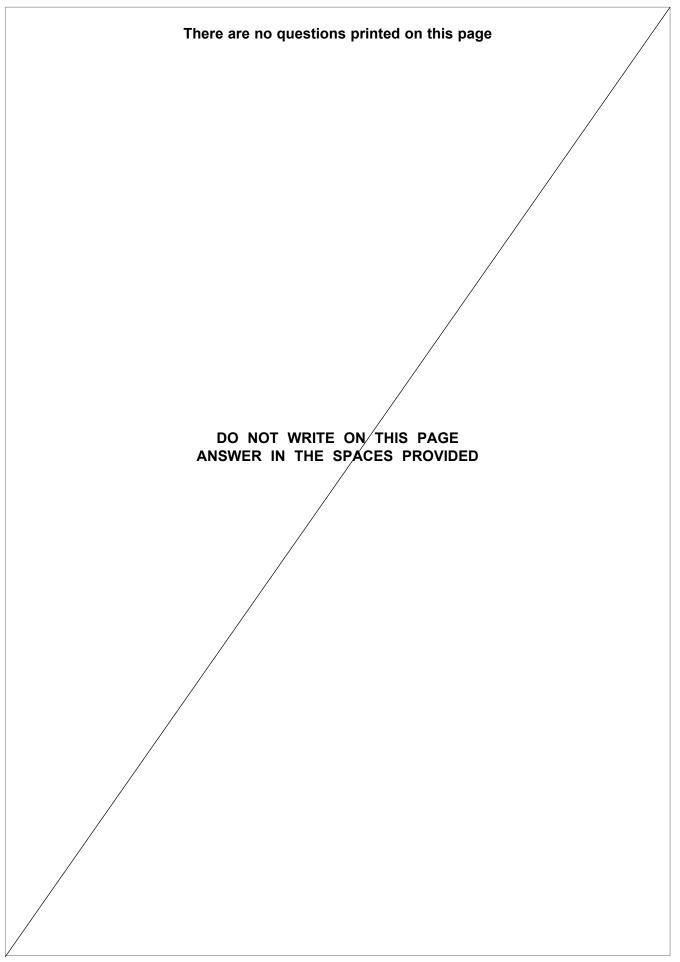


4	(e)	Titanium (Wrist watch strap and casing)
		Property
		Relevance to product
		Property
		Relevance to product
		(4 marks)

20









		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.
		(6 marks)
		Question 5 continues on the next page



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



(10 marks)

Question 5 continues on the next page



20

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.
		(4 marks)



Section C

Answer this question.

6	(a) (i)	Study the photographs of the Thermos® cup (Figures 2 to 5) on the Insert Sheet and answer the following questions. Name a suitable specific metal for part A of the cup.
_	(, (-,	The second secon
		(1 mark)
6	(a) (II)	Briefly explain three reasons why this metal is suitable.
		/C manufal
		(6 marks)

Question 6 continues on the next page



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.



(10 marks)

Question 6 continues on the next page



6	(a) (iv)	Name a suitable specific polymer for part B of the cup.
		(1 mark)
6	(a) (v)	Briefly explain three reasons why this polymer is suitable.
		(6 marks)



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.





(16 marks)

40

END OF QUESTIONS

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