Centre Number			Candidate Number		
Surname					
Other Names					
Candidate Signature					



General Certificate of Education Advanced Subsidiary Examination January 2013

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

PROD1

Unit 1 Materials, Components and Application

Thursday 10 January 2013 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 only for drawing.
- Fill in the boxes at the top of this page.
- Answer six questions.
- Answer all questions in Section A.
- Answer one question from Section B, either Question 6 or Question 7.
- Answer Question 8 in Section C.
- You must answer the questions in the spaces provided. Do not write outside the box around each page.
- 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.





For Examiner's Use

Section A

	A CHARLES AND A
	Answer all of the questions in this section.
1 (a)	Explain what is meant by the term computer numerical control.
	(2 marks)
1 (b)	Give an application for computer numerical control and give one reason why it is used. Application
	Reason
	(2 marks)



2	Plywood is a man-made board.		
	Name a product it is used in and give two reasons why it is suitable for the have named.	product you	
	Product		
	Reason 1		
	Reason 2		
		(3 marks)	
			3
3	Match the following pieces of workshop equipment to the correct application below.	ns shown	
	A Centre lathe		
	B Milling machine		
	C Brazing hearth with gas-air torch		
	D Bandsaw		
	You should use each letter once only.		
	Application	Equipment	
	Cutting sheet acrylic into 100mm squares		
	Reducing the diameter of an aluminium bar		
	Cutting a 10mm slot into a 50 x 50mm mild steel block		
	Annealing a piece of copper sheet		
		(4 marks)	

4 Figure 1 Figure 2





4 (a) Figures 1 and **2** are health and safety signs. Name a specific process or situation where you will see each of these signs in use.

Figure 1	
Figure 2	
(2 × 1 mar	
Explain fully why there is a need to take the precaution shown in each sign.	
Figure 1	

 (2	ן	2 m	ark	s)

6

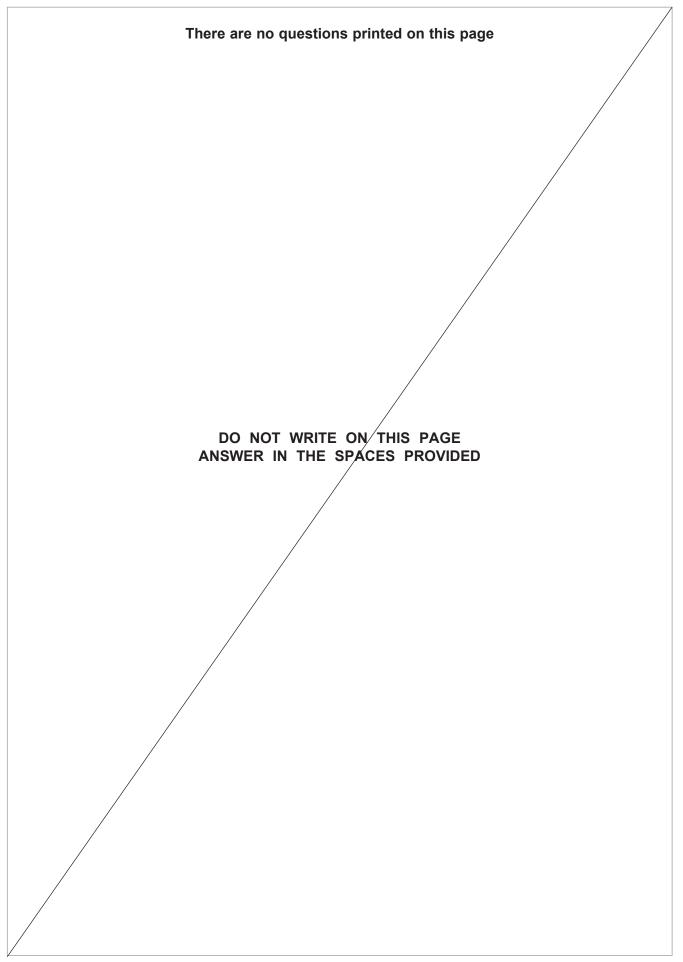
4 (b)

box

5

5	Explain why ultra violet hardening adhesive is considered a safer alternative to cyanoacrylate (superglue) for use in a school workshop.	
	(3 marks)	_
	(3 marks)	_
	Turn over for the next question	L







Section B

Answer either Question 6 or Question 7.

6	Figure 3 on the Insert Sheet shows a concrete bench for use in an outdoor area.
	Answer the following questions.
6 (a)	Explain in detail why concrete is a suitable material for the bench.
	(6 marks)

Question 6 continues on the next page



6 (b)	Use notes and diagrams to describe the most appropriate method for batch producing a concrete bench like this.



(8 marks)

Question 6 continues on the next page



6 (c)	The seat section of the bench can crack. Use notes and diagrams to explain how the bench could be modified to prevent this.



(6 marks)

20

Turn over for the next question



Do not answer this question if you have answered Question 6.

7 (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) Nickel plated steel sheet	Pencil case
(ii) High impact polystyrene	Disposable razor



7 (a) (i)	Nickel plated steel sheet (Pencil case)
	(8 marks)
	Question 7 continues on the next page



7 (a) (ii)	High impact polystyrene (disposable razor)
	(-ـــــ ۵۰۰
	(8 marks)

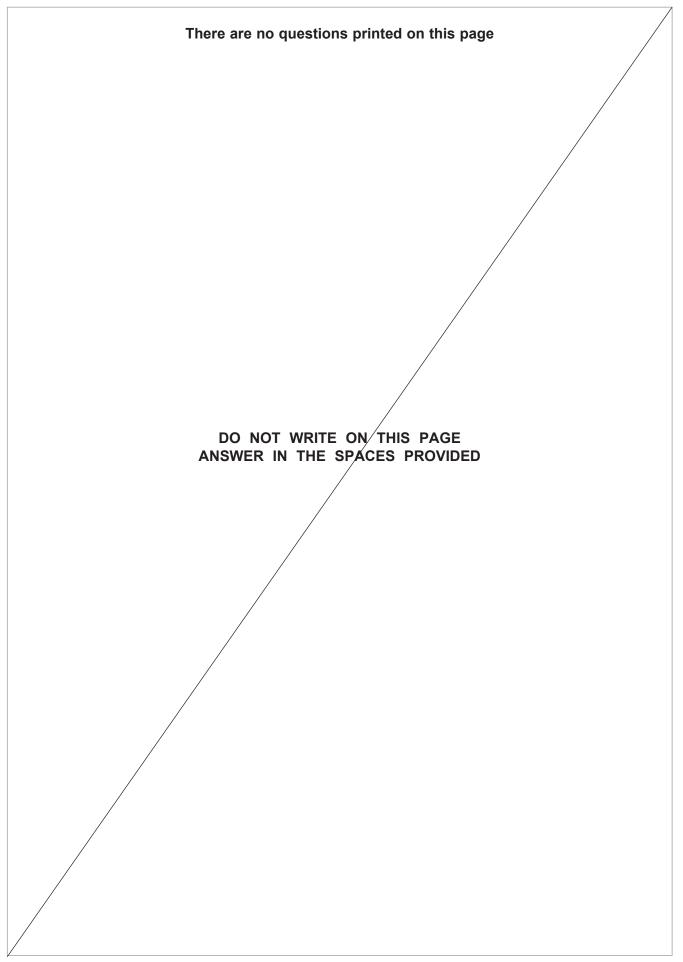


7	(b)	Cellulose acetate is sometimes used in food packaging. Explain why it might be used in such an application.
		(4 marks)

Turn over for the next question

20







Section C

fou must answer this question.					
8	Figures 4 and 5 on the Insert Sheet show a themed collection box used in a wildlife park.				
	Answer the following questions.				
8 (a) (i)	Name a suitable timber based man-made board that could be used to make part A of the collection box.				
	(1 mark)				
8 (a) (ii)	Explain in detail why the man-made board you have named in part (i) is suitable.				
	(6 marks)				

Question 8 continues on the next page



8 (a) (iii)	Part B has been made from acrylic sheet. Give two reasons why this is suitable.		
	(2 × 2 marks)		
8 (b) (i)	Use notes and diagrams to describe how all parts of the collection box have been fabricated as a one-off product.		



(9 marks)

Question 8 continues on the next page



Explain why fabrication is a suitable type of manufacture for the collection box.	
(4 marks)	
The timber based parts of the collection box have been finished by painting. Name specific paints that could have been used and describe the finishing process in detail.	
(4 marks)	



Question 8 continues on the next page	



- **8 (d)** Use notes and diagrams to develop the design of the collection box. In your answer, you should consider the following specification:
 - Be suitable for production in small batches (e.g. 3 to 5 per production run)
 - Be made from material that will be weatherproof
 - Include an interactive or fun element to encourage donations.



(12 marks)

40

END OF QUESTIONS



