

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
January 2011

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

PROD1

Unit 1 Materials, Components and Application

Thursday 20 January 2011 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 **five** questions.
- Answer **all** questions in Section A.
- Answer **one** question from Section B, **either** Question 4 **or** Question 5.
- Answer Question 6 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.



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

M/Jan11/PROD1

PROD1

Section A

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

1 (a) (i) Name a smart material.

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(1 mark)

1 (a) (ii) For the smart material you have named in part (a)(i)

- name a product this is used in
- give **two** reasons why the material is suitable for the product named.

Product.....

Reasons for use

1.....

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2.....

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(2 × 2 marks)



1 (b) (i) Name a fibre re-inforced composite material.

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(1 mark)

1 (b) (ii) For the fibre re-inforced composite you have named in part (b)(i)

- name a product that this material is used in
- give **two** reasons why this material is suitable for the product named.

Product.....

Reason for use

1.....

2.....

(2 × 2 marks)

10

Turn over for the next question

Turn over ▶



2 Match the finishes listed below to the materials and applications given.

- A Galvanizing
- B Dip coating polymer
- C Chrome plating
- D Acrylic based paint

In each case put the correct letter in the boxes on the right.
You must only use each finish once.

Material and application

Finish

Sheet mild steel waste bin for exterior use

Cast brass bathroom taps

Moulded polymer car bumper

Forged steel pliers

(4 marks)

4



3 (a) Match the fabrication methods listed with the materials and applications given.

- A** Mortice and tenon
- B** Dovetail
- C** Spot welding
- D** Brazing

In each case put the correct letter in the boxes on the right.
You must only use each fabrication method once.

Material and application

Fabrication method

Joining mild steel sheet to make a box

Joining tubular mild steel to make a frame for a chair

Joining 50 × 50 mm section timber to make a frame for a table

Joining 100 × 15 mm timber planks together to make a drawer

(4 marks)

3 (b) For **one** of the fabrication methods given in part (a), explain why it is used in the application you have indicated.

Fabrication method

Application

Reason for use

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(2 marks)

6

Turn over for the next question

Turn over ▶



Section BAnswer **either** Question 4 **or** Question 5

4 (a) For **each** of the following materials, explain in detail why it is suitable for the product listed.

Your answer should make reference to:

- product function
- product aesthetics
- product manufacture.

Material	Product
(i) Thermoplastic Elastomer (TPE)	TV remote control
(ii) Polylactide (PLA)	Carrier bags
(iii) Laminated card	Drinks cartons



4 (b) Polylactide (PLA) is one material used for carrier bags. Name an alternative material that could be used and state **one** reason why this material would be suitable.

Material

Reason

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(2 marks)

20



Do not answer this question if you have answered Question 4.

5 Study the photograph of the fruit packaging (**Figure 1** on the Insert Sheet).

5 (a) Name a suitable polymer for the fruit packaging.

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(1 mark)

5 (b) Give **two** reasons why this polymer is suitable.

Reason 1

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Reason 2

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(2 × 2 marks)

Question 5 continues on the next page

Turn over ▶



5 (c) Use notes and diagrams to show how the fruit packaging would be vacuum formed.

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(9 marks)



5 (d) Food packaging can have a negative impact upon the environment.
Explain how this can be minimised.

You may use diagrams to support your answer.

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(6 marks)

20

Turn over ▶



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ANSWER IN THE SPACES PROVIDED**



6 (a) (iii) The playset pieces are manufactured using the injection moulding process. Use notes and diagrams to describe this manufacturing process.

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(9 marks)



6 (a) (iv) Explain why injection moulding is the process used to make these playset pieces.

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(4 marks)

6 (a) (v) Explain how the designer has ensured that the playset will appeal to the intended target market.

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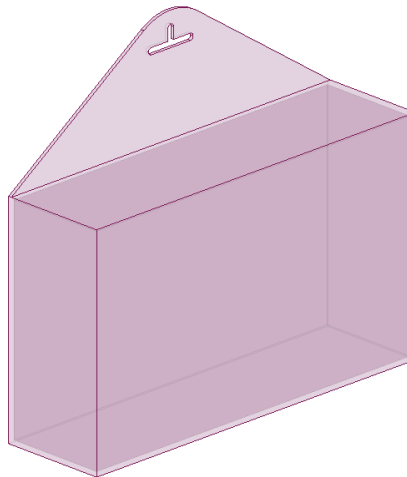
(4 marks)

Question 6 continues on the next page

Turn over ▶



6 (b) Study the CAD drawing of a basic package for the playset pieces shown below.



Use notes and diagrams to show how the package could be developed to

- appeal to the target market of girls aged 5 to 10 years
- provide suitable retail packaging.

In your answer you should make reference to

- function
- aesthetics
- materials
- manufacture.

Where colour is used in any diagrams you should label which colours have been used.

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(16 marks)

40

END OF QUESTIONS



There are no questions printed this page

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