

Surname						Other Names					
Centre Number						Candidate Number					
Candidate Signature											

For Examiner's Use
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General Certificate of Secondary Education  
June 2006

**DESIGN AND TECHNOLOGY  
(RESISTANT MATERIALS TECHNOLOGY) (Short Course)  
Written Paper  
Higher Tier**

**3555/H  
H**



Thursday 25 May 2006 9.00 am to 10.30 am

<p><b>For this paper you must have:</b></p> <ul style="list-style-type: none"> <li>• a pen, pencil, ruler, eraser, pencil sharpener and coloured pencils</li> <li>• an insert of colour photographs (enclosed)</li> </ul>
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Time allowed: 1 hour 30 minutes

**Instructions**

- Use blue or black ink or ball-point pen. Use pencil and coloured pencils only for drawing.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- Answer the questions in the spaces provided.
- Do all rough work in this book. Cross through any work you do not want to be marked.
- Show the working of your calculations.

**Information**

- The maximum mark for this paper is 100.
- The marks for questions are shown in brackets.
- You are reminded of the need for good English and clear presentation in your answers.

For Examiner's Use			
Question	Mark	Question	Mark
1		9	
2		10	
3			
4			
5			
6			
7			
8			
Total (Column 1) →			
Total (Column 2) →			
<b>TOTAL</b>			
Examiner's Initials			

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**Questions 1 to 3 on this paper relate to the Design Brief given below.**

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**Design brief**

A manufacturer of children's toys has asked you to design an educational toy.

The toy is for a child aged between 6 months and 3 years.

Your ideas should focus on the following situations:

Situation 1 a toy which encourages a young child to walk;

Situation 2 a toy which uses a mechanism.

Answer **all** questions in the spaces provided.

**Question 1 is about the design specification.**

**You should spend about 5 minutes on this question.**

- 1** Give **four** design requirements for a child’s educational toy. (The toy is for a child aged between 6 months and 3 years.)

Explain each of your answers.

Requirement 1: .....

Explanation: .....

.....  
(2 marks)

Requirement 2: .....

Explanation: .....

.....  
(2 marks)

Requirement 3: .....

Explanation: .....

.....  
(2 marks)

Requirement 4: .....

Explanation: .....

.....  
(2 marks)

8

**Turn over ►**

**Question 2 is about design ideas.**

**You should spend about 30 minutes on this question.**

- 2** Study your **design specification** (question 1) and the information given in the **design brief** (page 2).

Use this information to help you to sketch **one** idea for **each** situation.

Remember to:

- add notes to explain your sketches;
- evaluate each idea.

This question is worth 24 marks.

Marks will be awarded for:

- two different ideas; *(2 × 6 marks)*
- quality of sketches; *(5 marks)*
- quality of notes; *(3 marks)*
- quality of evaluations. *(2 × 2 marks)*

**Situation 1 a toy which encourages a young child to walk**

Evaluation : .....

.....

**Situation 2 a toy which uses a mechanism**

(You will be asked to develop this mechanism in Question 3.)

Evaluation : .....  
.....

**Turn over for the next question**

**Question 3 is about systems and control.**

**You should spend about 10 minutes on this question.**

- 3** Use notes and sketches to show details of the mechanism you have used in **Question 2 (Situation 2)**.

Show clearly how the mechanism works.

Marks will be awarded for:

- details of the mechanism; *(5 marks)*
- quality of sketches; *(2 marks)*
- quality of notes. *(3 marks)*

**Question 4 is about making.**

**You should spend about 15 minutes on this question.**

- 4 **Figure 1** on the colour insert sheet shows two designs for a counting frame which could be made in a school workshop.

Choose **one** of the counting frames.

Chosen counting frame: .....

Use notes and sketches to show clearly how you would make **a batch of ten** counting frames.

At each stage, name all the tools and equipment you would use.

Answer this question on pages 8 and 9.

**Question 4 continues on the next page**

**Turn over ►**

Stage 1: Marking out **or** CAD (computer aided design)

*(4 marks)*

Stage 2: Shaping and drilling **or** CAM (computer aided manufacture)

*(4 marks)*

Stage 3: Joining the frame to the base

*(4 marks)*

Stage 4: Finishing

*(2 marks)*

**Question 5 is about designing.**

**You should spend about 5 minutes on this question.**

**5** A model is often produced during the designing of a product.

Study **Figure 2** and **Figure 3** on the colour insert sheet.

Give **one advantage** and **one disadvantage** of using construction kits, such as those shown in **Figure 2** on the colour insert sheet, rather than the modelling materials shown in **Figure 3** on the colour insert sheet.

Explain your answers.

Advantage: .....  
.....  
*(1 mark)*

Explanation: .....  
.....  
*(1 mark)*

Disadvantage: .....  
.....  
*(1 mark)*

Explanation: .....  
.....  
*(1 mark)*

**4**

**Question 6 is about health and safety.**

**You should spend about 5 minutes on this question.**

**6** Handling and working with plastic can be a dangerous activity.

Complete the table shown below.

<b>Hazard</b>	<b>Risk to user</b>	<b>Safety precaution</b>
Picking up hot plastic		
Hot plastic gives off fumes		
Adhesive touches clothing		

*(6 marks)*

<hr/> <b>6</b>
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**Turn over for the next question**

**Turn over ►**

**Question 7 is about materials and finishes.**

**You should spend about 5 minutes on this question.**

7 Study the high chairs shown in **Figure 4** on the colour insert sheet.

- (a) Name **one** suitable, *specific* material from which to make the *frame* of **high chair A** and **high chair B**. Give **two** reasons for each choice.

**High chair A**

Material: ..... (1 mark)

Reason 1: ..... (1 mark)

Reason 2: ..... (1 mark)

**High chair B**

Material: ..... (1 mark)

Reason 1: ..... (1 mark)

Reason 2: ..... (1 mark)

- (b) Name **one** suitable, *specific* finish for the material you have chosen for **high chair A**.

Finish: ..... (1 mark)

- (c) Give a specific health and safety requirement of a finish which is to be used on a high chair.

Health and safety requirement: ..... (1 mark)

**Question 8 is about environmental issues.**

**You should spend about 5 minutes on this question.**

**8** Plastic materials are widely used in the manufacture of children’s toys.

Explain how the use of plastics affects the environment.

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*(8 marks)*

**Turn over for the next question**

8
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**Turn over ►**

**Question 9 is about using ICT.**

**You should spend about 5 minutes on this question.**

**9** Designers and manufacturers of children’s educational toys may use the Internet in their work.

(a) Give **three** ways designers and manufacturers of children’s educational toys could use the Internet in their work.

1 ..... (1 mark)

2 ..... (1 mark)

3 ..... (1 mark)

(b) Give **three** advantages of using CAD (computer aided design) rather than designing with paper and pencil.

Advantage 1: ..... (1 mark)

Advantage 2: ..... (1 mark)

Advantage 3: ..... (1 mark)

**Question 10 is about product development.**

**You should spend about 5 minutes on this question.**

**10** Study the play centre shown in **Figure 5** on the colour insert sheet.

- (a) Give **two** features of the play centre which make it appealing to a child.

Explain each of your answers.

Feature 1: .....

Explanation: .....

.....

*(2 marks)*

Feature 2: .....

Explanation: .....

.....

*(2 marks)*

- (b) Explain how developments in material and manufacturing technology have assisted the design and manufacture of the product.

Explanation: .....

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*(8 marks)*

**END OF QUESTIONS**

**There are no questions printed on this page**

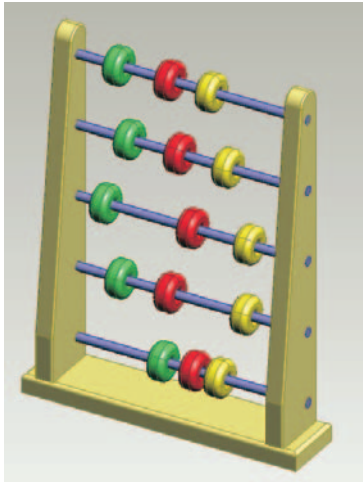
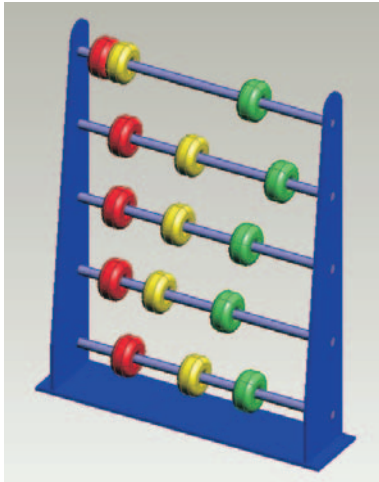
**DESIGN AND TECHNOLOGY  
(RESISTANT MATERIALS TECHNOLOGY)  
FULL AND SHORT COURSES**

**H**


**Higher Tier**

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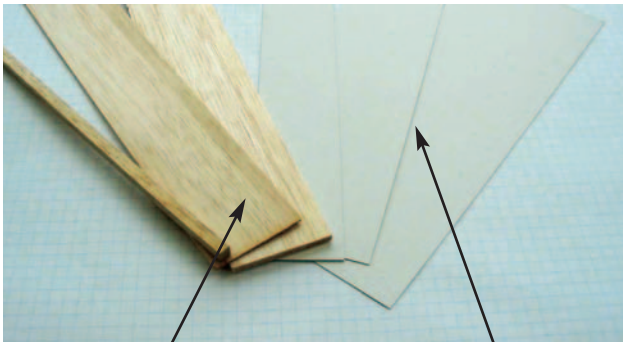
**Figure 1**

<p><b>Design One – a wooden product</b></p> 	<p><b>Design Two – a plastic or metal product</b></p> 
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**Figure 2**



**Figure 3**



**Balsa**                      **Card**

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**Figure 4**

**High chair A**



**High chair B**



**High chair C**

Image of metal high chair.

**Figure 5**

Image of children playing on a slide which is part of a play centre.

For copyright reasons it has not been possible to include two of the images on this page.

A full copy of the paper and insert can be obtained from Centre Services.

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