Surname		Other Names	
Centre Number			Candidate Number									
Candidate Signature												

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General Certificate of Secondary Education
June 2005

ASSESSMENT and QUALIFICATIONS ALLIANCE

DESIGN AND TECHNOLOGY: RESISTANT MATERIALS TECHNOLOGY
Higher Tier

3545/H

H

Thursday 26 May 2005 9.30 am to 11.30 am

In addition to this paper you will require:
- a pen, pencil, ruler, eraser, pencil sharpener and coloured pencils;
- a colour insert sheet (enclosed).

Time allowed: 2 hours

Instructions
- Write your name and other details in the spaces provided above.
- Answer **all** the questions in the spaces provided.

Information
- The maximum mark for this paper is 125.
- Mark allocations are shown in brackets.
- A colour insert sheet has been provided for use in answering questions in this paper.
- Wherever calculations are needed you should show your working.
- All dimensions are given in millimetres unless otherwise stated.
- You are reminded of the need for good English and clear presentation.

For Examiner's Use			
Number	Mark	Number	Mark
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
Total (Column 1) →			
Total (Column 2) →			
TOTAL			
Examiner's Initials			

Questions 1 to 4 on this paper relate to the Design Brief given below.

Design brief

A manufacturer of office equipment has asked you to design a *desktop organiser* which includes a mobile phone holder.

Examples of the type of office stationery and equipment which could be stored, and a typical mobile phone, are shown as **Figure 1** on the colour insert sheet.

A black and white copy of **Figure 1** is shown below.

The image which appeared here has not been reproduced due to third-party copyright constraints.

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'Post-it' is a registered trademark of 3M company
www.snowpake.net
West Mercia Supplies (WMS) SY3 5HJ
www.imation.co.uk

Figure 1

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 of the *desktop organiser*.

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

Question 2 is about design ideas.

You should spend about 40 minutes on this question.

2 Study the information given in the **design brief** and your **design specification**.

Use this information to help you sketch **three** different design ideas for a *desktop organiser* which includes a mobile phone holder.

Remember to:

- include the mobile phone holder
- add notes to explain your sketches
- evaluate each idea.

Marks will be awarded for:

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

Idea 1

Evaluation: .....

.....

Idea 2

Evaluation: .....

.....

Idea 3

Evaluation: .....

.....

35

Question 3 is about designing.

You should spend about 5 minutes on this question.

3 Before a *desktop organiser* goes into production a prototype would be made.

(a) Explain the term *prototype*.

.....

.....

.....

(2 marks)

(b) Explain the *advantages* to the *manufacturer* of making a prototype.

.....

.....

.....

.....

.....

.....

.....

.....

(4 marks)

6

Question 4 is about the manufacture of your best idea.

You should spend about 15 minutes on this question.

4 Choose your best design idea from **Question 2**.

Chosen idea: Number .....

Using notes and sketches clearly show details of the *industrial method of manufacture* which could be used to produce your design in a **batch of 5000**.

Marks will be awarded for:

- suitable method of manufacture; *(10 marks)*
- quality of sketches; *(2 marks)*
- quality of notes. *(2 marks)*

Question 5 is about health and safety.

You should spend about 4 minutes on this question.

5 Drilling machines must be regularly maintained to keep them in safe working order.

List **two** checks that are made on a drilling machine to make sure it is in safe working order.

Explain why this check is important.

Check 1: .....

Explanation: .....

.....

(2 marks)

Check 2: .....

Explanation: .....

.....

(2 marks)

4

TURN OVER FOR THE NEXT QUESTION

Question 6 is about systems and control.

You should spend about 15 minutes on this question.

6 (a) Study *the paper punch* and *the pencil sharpener*, shown as **Figure 2**, on the colour insert sheet.

Complete **Table 1**.

	Input	**Process**	**Output**
the paper punch			
the pencil sharpener			

Table 1

(6 marks)

(b) Study the chair shown as **Figure 3** on the colour insert sheet.

Describe how the **designer** has resolved the following issues.

Explain each of your answers.

Stability: .....

.....

(1 mark)

Explanation: .....

.....

.....

(2 marks)

Mobility: .....

.....

(1 mark)

Explanation: .....

.....

.....

(2 marks)

Height adjustment: .....

.....

(1 mark)

Explanation: .....

.....

.....

(2 marks)

Back rest adjustment: .....

.....

(1 mark)

Explanation: .....

.....

.....

(2 marks)

18

TURN OVER FOR THE NEXT QUESTION

Question 7 is about materials and finishes.

You should spend about 10 minutes on this question.

7 Study the magazine files shown as **Figure 4** on the colour insert sheet.

(a) Name **one** suitable, *specific* material from which to make each type of magazine file and give **two** reasons for your choice.

Magazine file A

Material: .....
(1 mark)

Reason 1: .....

Reason 2: .....
(2 marks)

Magazine file B

Material: .....
(1 mark)

Reason 1: .....

Reason 2: .....
(2 marks)

Magazine file C

Material: .....
(1 mark)

Reason 1: .....

Reason 2: .....
(2 marks)

(b) (i) Choose **one** suitable, *specific* finish for the material you have chosen for **Magazine file A**.

Magazine file A

Finish: .....
(1 mark)

(ii) Choose **one** suitable, *specific* finish for the material you have chosen for **Magazine file B**.

Magazine file B

Finish: .....
(1 mark)

Question 8 is about scale of production.

You should spend about 10 minutes on this question.

8 (a) Complete **Table 2**, by entering a description of each scale of production.

Name a typical product which is made by this method.

One example has been completed for you.

Scale of Production	Description	Product
One-off production	*A single product is made*	*The Eiffel Tower*
Batch production		
Mass production		
Continuous production		

Table 2

(6 marks)

(b) Explain how the scale of production affects the cost of the product.

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(6 marks)

12

Question 9 is about industrial practice.

You should spend about 8 minutes on this question.

9 **Figure 5** shows a piece of round, mild steel bar. It has a machined spigot on one end.

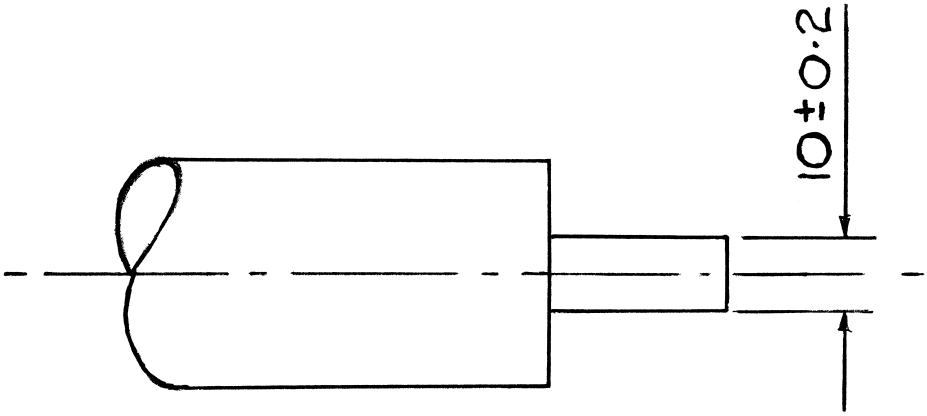

Figure 5

(a) What is the **minimum** diameter of the spigot?

Minimum size = ...

(1 mark)

(b) What is the **maximum** diameter of the spigot?

Maximum size = ...

(1 mark)

(c) Name the tool that should be used to measure the spigot.

Tool: .....

(1 mark)

(d) Explain **one** advantage of using a gauge rather than the tool you have named in (c), when several of these components are to be made.

Advantage: .....

.....

(2 marks)

(e) Explain the importance of 'tolerance' when manufacturing components.

.....

.....

.....

.....

.....

(4 marks)

9

Question 10 is about consumer protection.

You should spend about 8 minutes on this question.

10 (a) Name a product which is most likely to display each of the following symbols.

Product: .....

(1 mark)

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Product: .....

(1 mark)

(b) Describe the work of the BSI (British Standards Institute) and explain its importance to the **consumer**.

.....

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(6 marks)

8

END OF QUESTIONS

THERE ARE NO QUESTIONS PRINTED ON THIS PAGE

General Certificate of Secondary Education
June 2005

DESIGN AND TECHNOLOGY: RESISTANT MATERIALS TECHNOLOGY: FULL AND SHORT COURSE

3555H/3545H

Higher Tier

H

This insert is provided for use in the examination.

Figure 1

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Figure 1—'Post-it' is a registered trademark of 3M company,
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—West Mercia Supplies (WMS) SY3 5HJ,
—www.imation.co.uk

Figure 4— www.NelsonThornes.com

This insert page should **not be** sent to the examiner.

Figure 2

Figure 3

A

B

C

Figure 4