

OXFORD CAMBRIDGE AND RSA EXAMINATIONS
General Certificate of Secondary Education

**D&T: RESISTANT MATERIALS
 TECHNOLOGY**



1956/4

PAPER 4 HIGHER TIER

Wednesday **14 JUNE 2006** Afternoon 1 hour 15 minutes

Candidates answer on the question paper.
 No additional materials are required.

Candidate
 Name

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Centre
 Number

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Candidate
 Number

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TIME 1 hour 15 minutes

INSTRUCTIONS TO CANDIDATES

- Write your name, Centre number and candidate number in the spaces at the top of this page.
- Answer **all** questions.
- Write your answers in the spaces provided on the question paper.
- Do not write in the bar code. Do not write in the grey area between the pages.
- **DO NOT WRITE IN THE AREA OUTSIDE THE BOX BORDERING EACH PAGE. ANY WRITING IN THIS AREA WILL NOT BE MARKED.**

INFORMATION FOR CANDIDATES

The number of marks is given in brackets [] at the end of each question or part question.

Dimensions are given in millimetres unless stated otherwise.

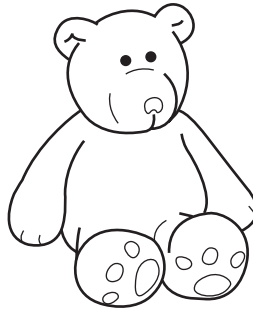
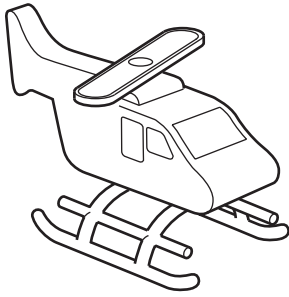
Question 2, product analysis, is based on the theme ‘**Mechanical Reachers**’ printed in the specification.

Total marks for this paper is **50**.

FOR EXAMINER'S USE	
Question 1	
Question 2	
Question 3	
Question 4	
Question 5	
TOTAL	

This question paper consists of 11 printed pages and 1 blank page.

1 Manufacturers produce childrens' toys in quantity. The designer uses a design brief to meet the requirements of the need, the user and the potential market.



(a) In the table below tick (✓) **one** statement that would be the **most** suitable design brief for a toy manufacturer.

Design Brief	✓
Design a brightly coloured and safe toy for my own use.	
Design an educational toy suitable for children between the ages of 3 and 5 years old that could be batch produced.	
Design a red lorry with four wheels suitable for boys.	
Design and make a toy suitable for young children.	

[1]

(b) Add **two** further specification points for a child's toy.

- The toy should be appealing to girls and boys.
- The toy should be able to be batch produced.

• _____ [1]

• _____ [1]

(c) Give **two** reasons why a designer would use a model before manufacturing a toy in quantity.

1 _____ [1]

2 _____ [1]

(d) A risk assessment would be carried out before manufacturing toys in quantity.

Explain the purpose of a risk assessment.

_____ [2]

(e) Jigs are used when manufacturing products in quantity.

Give **two** benefits to the manufacturer of using jigs when manufacturing products in quantity.

1 _____ [1]

2 _____ [1]

(f) Manufactured products are tested and evaluated.

Describe **one** test that could be carried out on a child's toy.

_____ [1]

- 2 This question is based on the theme of 'Mechanical Reachers'.
Fig. 1 shows a view of a handheld mechanical reacher.

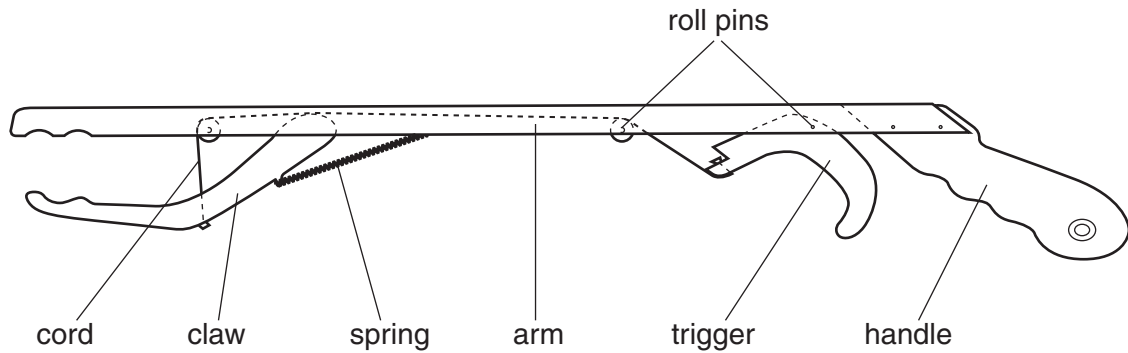


Fig. 1

The arm of this design of reacher is made from metal.

- (a) Name a suitable metal for the arm of the reacher.

_____ [1]

- (b) State **one** property of the metal named in part (a) which makes it suitable for reachers.

_____ [1]

- (c) Identify **two** different user groups who might use a handheld reacher.

1 _____ [1]

2 _____ [1]

- (d) Some types of reacher are designed to fold.

Give **two** advantages to the user of a folding design.

1 _____

_____ [1]

2 _____

_____ [1]

- (e) The handle, trigger, and claw of the reacher shown in Fig. 1 are all held in position by roll pins.

Give **one** reason why this type of fixing is used.

_____ [1]

(f) Fig. 2 shows details of the claw mechanism of the reacher.

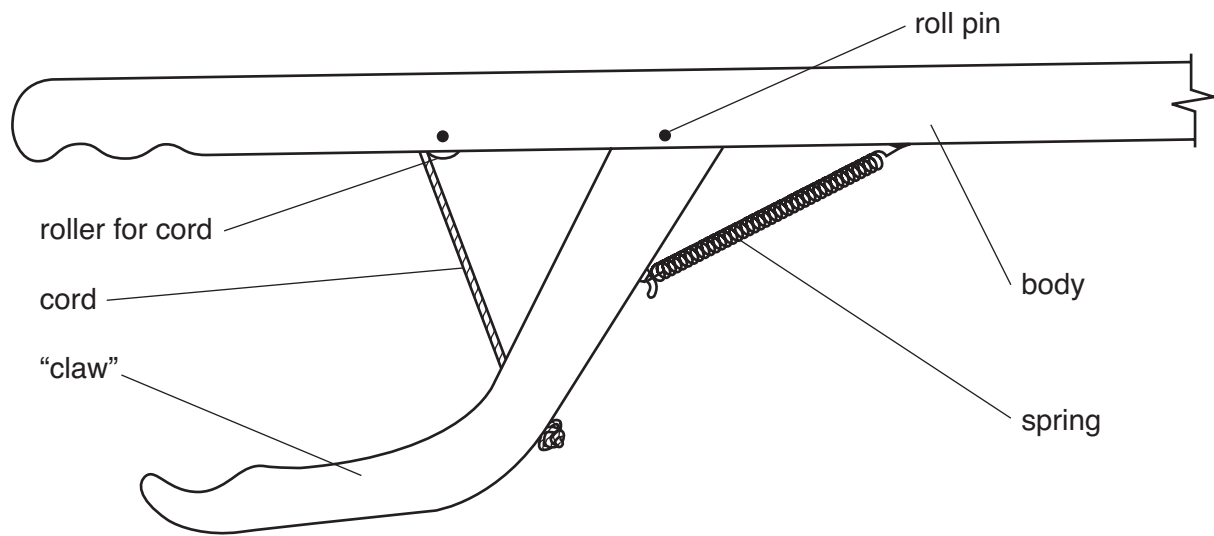


Fig. 2

Use sketches and notes to show a modification to the claw mechanism which would allow the claw to close with less movement of the trigger.

3 Fig. 3 shows views of a child's garden swing.

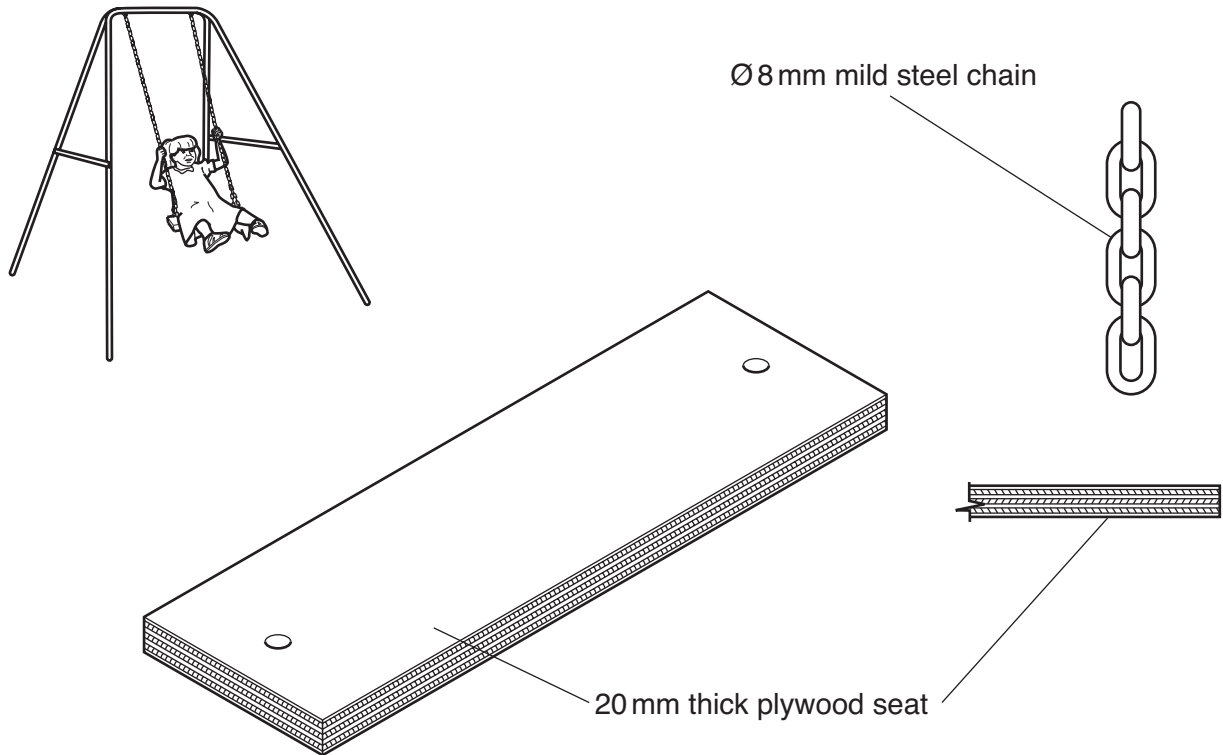


Fig. 3

(a) The chain is made from welded steel links.

Name a suitable surface finish, other than paint, for the chain.

_____ [1]

(b) The seat could be made from exterior grade plywood.

Give **two** reasons why exterior grade plywood is a suitable material for the seat.

1 _____ [1]

2 _____ [1]

(c) Suggest **one** ergonomic improvement that could be made to the swing seat.

_____ [1]

(d) A child's finger could get trapped between the chain links.

Describe **one** method of solving this problem.

[2]

(e) Use sketches and notes to show how the end of the chain could be attached to the plywood seat so that the fixing:

- is secure; and
- does not damage the plywood seat.

Include details of any pre-manufactured components used in your design.

4 Fig. 4 shows views of a shelf peg. The pegs will be mass produced.

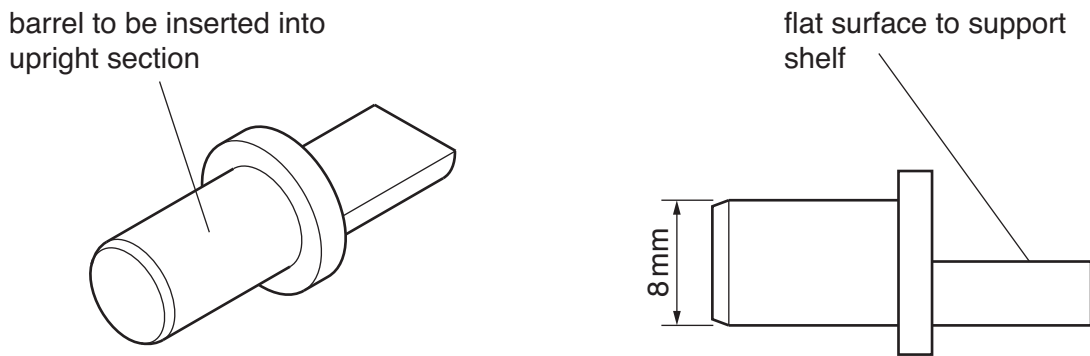


Fig. 4

(a) The pegs are made from plastic.
Name a suitable manufacturing process for the shelf pegs.

_____ [1]

(b) Quality control checks are made during the manufacture of the shelf pegs.

Give **two** reasons why manufacturers need to include quality control checks.

1 _____

_____ [1]

2 _____

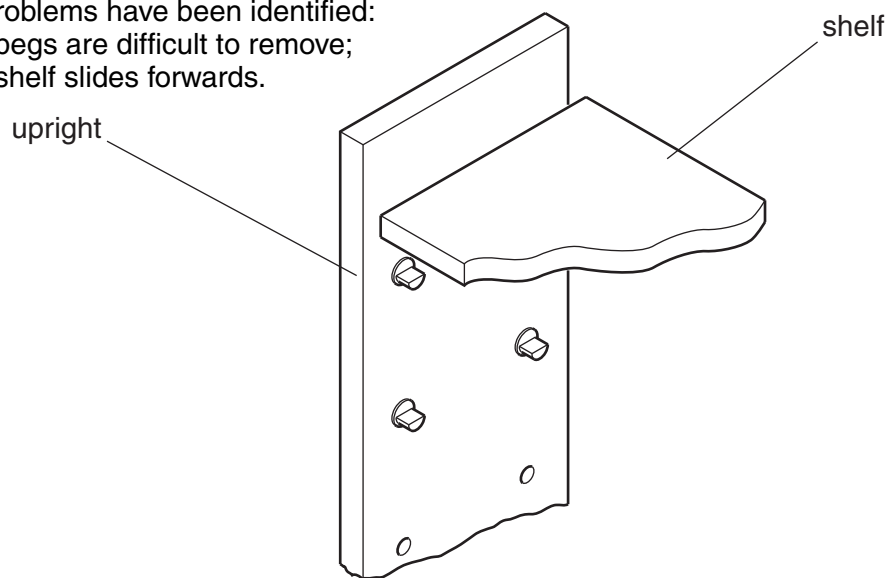
_____ [1]

(c) Give **one** example of a quality control check that could be carried out on the shelf pegs.

_____ [1]

(d) In use, **two** problems have been identified:

- the pegs are difficult to remove;
- the shelf slides forwards.



Use sketches and notes to show a modification to the design of the **shelf peg** to:

- make the pegs easier to remove; and
- retain the shelf securely.

[4]

- (e) The uprights and shelves are made from veneered chipboard. Over a period of time the holes for the shelf pegs become worn and the shelf pegs work loose.

Use sketches and notes to show a modification to the design of the **upright** to solve this problem.

[Turn over ^[2]

- 5 Fig. 5 shows a design of a toy train and trailer to be made in a school workshop. The funnel is shown removed from the body of the train. When the toy is pulled along the funnel moves up and down.

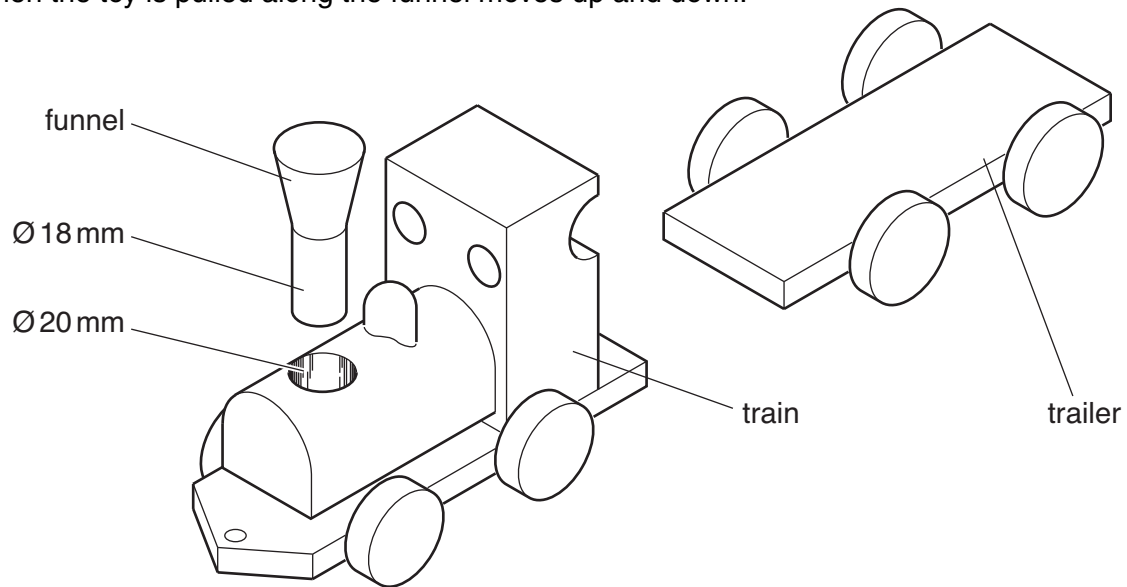


Fig. 5

- (a) Name a material that you could use to make the funnel.

Material _____

Use sketches and notes to show how you would make the funnel in your chosen material.

You should include details of the following:

- the name of the manufacturing process;
- preparation of chosen material;
- description of the manufacturing process;
- finish applied to the funnel.

(b) The train and trailer need to be connected.

Use sketches and notes to show modifications to the design of the train and trailer so that:

- the train and trailer can be easily connected and disconnected;
- no additional pre-manufactured standard components are required.

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