GCSE

Specimen Papers and Mark Schemes

Edexcel GCSE
Design & Technology: Resistant Materials Technology
Short course (3973)

For First Examination

Summer 2003

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Autumn 2000

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Contents

Centre Number						Paper Reference	Surname
Candidate Number						Candidate Signature	Other Names

For Examiner's use only

For Team Leader's use

3973/2F

Edexcel GCSE

Design and Technology: Resistant Materials Technology (Short Course)

Paper 2F

FOUNDATION TIER

Specimen Papers

Time: 1 hour.

N0000

Materials required for the examination
None

Items included with these question papers
None

Instructions to Candidates

In the boxes above, write your centre number, candidate number, the paper reference, your signature, your surname and other names. The paper reference is shown in the top left hand corner.
Attempt ALL questions using the spaces provided in the Question Paper.

Information for Candidates

You may use drawing equipment and coloured pencils.
All measurements are in mm unless otherwise stated.

Advice to Candidates

You are reminded of the importance of clear and orderly presentation in your answers.
Include diagrams where these are helpful.

Question Number	Leave Blank
1	
2	
3	
Total	

Turn over

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Answer ALL questions in the spaces provided.

Leave blank

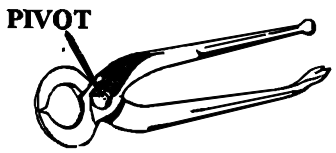
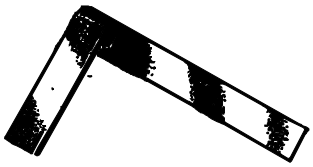
1. The table below shows either some tools or components or equipment.

(a) Complete the table by:

(i) naming each tool or component or equipment;

(ii) describing its use.

The first one is done for you.

TOOL/ COMPONENT/ EQUIPMENT	NAME	USE
	PINCERS	PULLING NAILS FROM WOOD
		
		
		

(6)

(b) The pincers use a round head rivet for the pivot.

Leave blank

(i) Draw a clear outline of a round head rivet.

(2)

(ii) Describe how the round end of the rivet is formed to make a suitable pivot for the pincers using school workshop equipment.

.....

.....

.....

.....

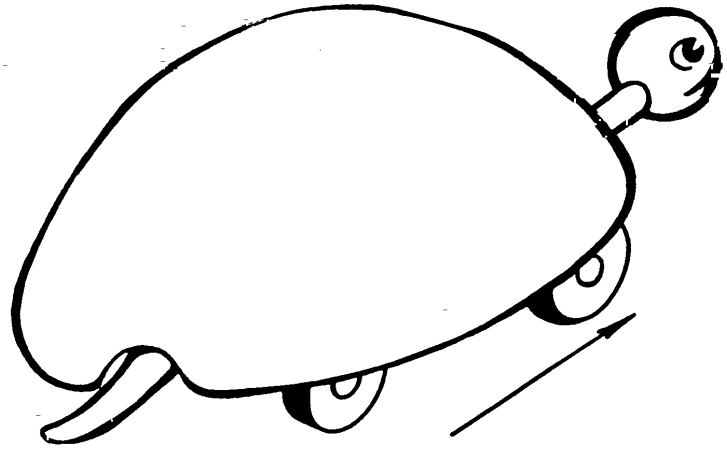
(3)

(Total 11 marks)

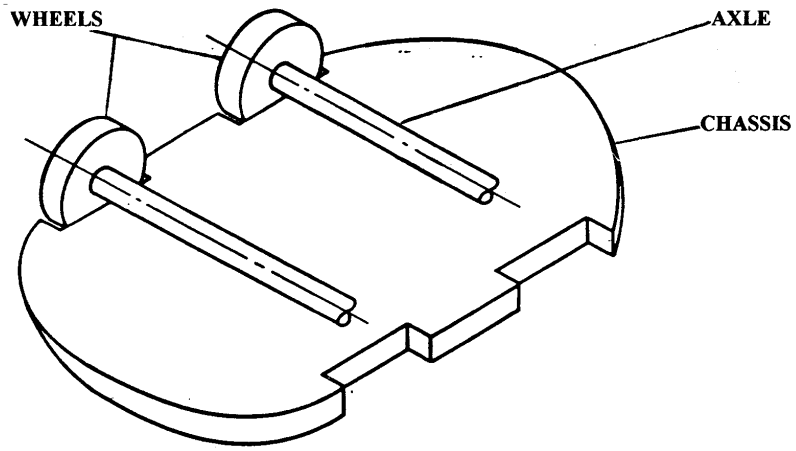
Turn over

Leave blank

2. The drawing below shows an idea for a young child's pull along toy tortoise.



(a) The drawing below shows some detail of the chassis.



(i) Name **two** suitable materials for the axles.

1 .....

2 .....

(2)

(ii) The wheels are to be made of 9mm thick plastic and have a 6mm hole drilled in the centre.

Name a suitable material for the plastic wheels.

.....

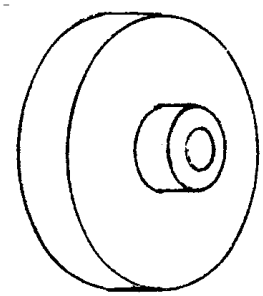
(1)

(iii) Use notes and sketches to add to the drawing above **one** method of fixing the axles to the plastic chassis that will allow the axles to turn freely.

(4)

(iv) Use notes and sketches to show **one** method of fixing the wheels to the axles that will allow the wheels to turn freely on the axle. Explain how your method works

Leave blank



Detail of wheel

Explanation.....

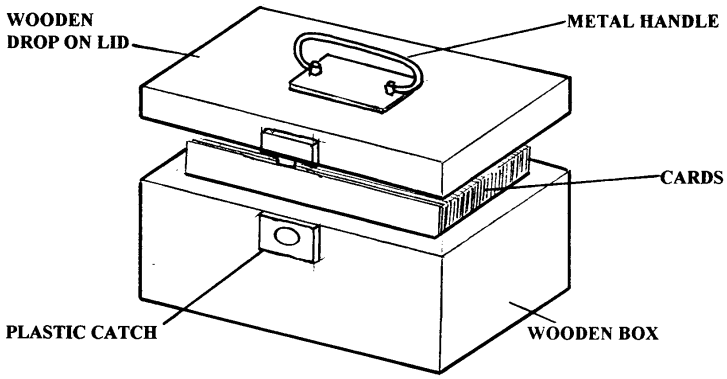
.....

(4)

(Total 11 marks)

Leave blank

3. The drawing below shows a container for storing address cards.



ADDITIONAL INFORMATION

The container is to be made of wood and will be used on an office desk.

(a) Two specification points for the container are:

- it must hold standard address cards which measure 140mm x 90mm;
- it must be easy to select cards from the container.

Give **three** more points of specification which could be included in the specification of this product. For each point, give a reason why it should be included.

1 .....

Reason .....

2 .....

Reason .....

3 .....

Reason .....

(6)

(b) Name the specific type of material suitable for making each of the following parts of the container.

Leave blank

(i) Wooden box

.....

(ii) Metal handle

.....

(iii) Plastic catch

.....

(3)

(c) Give **one** property associated with **one** of the materials you have named in (b) and explain how this property makes it suitable for this application.

Property .....

Explanation.....

.....

.....

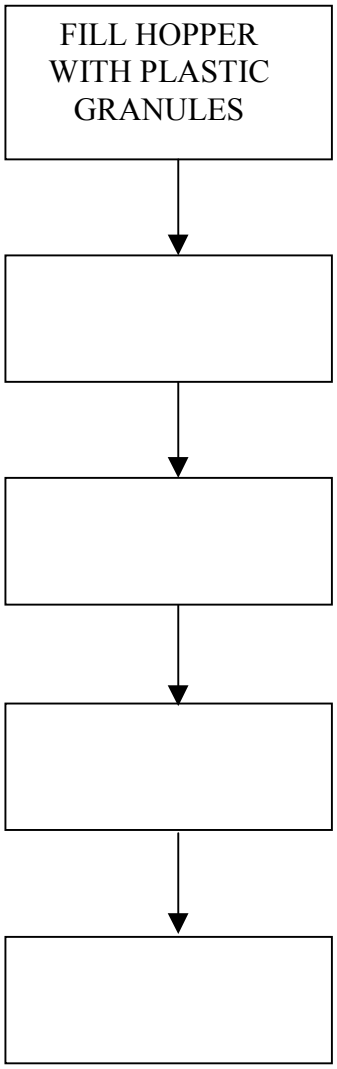
(4)

(d) The plastic catch is to be injection moulded in quantities of 1000.

Complete the diagram below to show the main stages in the injection moulding process.

The first stage has been done for you.

Leave blank



(5)

(e) The purpose of this desk top container is to store address cards and allow individual cards to be selected.

Leave blank

Describe how this design achieves its purpose.

.....

.....

.....

.....

(4)

(Total 22 marks)

PAPER TOTAL 44 MARKS

END

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Centre Number						Paper Reference	Surname
Candidate Number						Candidate Signature	Other Names

3973/2H

Edexcel GCSE

Design and Technology: Resistant Materials Technology (Short Course)

Paper 2H

HIGHER TIER

Specimen Paper

Time: 1 hour

N0000

For Examiner's use only

For Team Leader's use

Question Number	Leave Blank
1	
2	
3	
Total	

Materials required for the examination

None

Items included with these question papers

None

Instructions to Candidates

In the boxes above, write your centre number, candidate number, the paper reference, your signature, your surname and other names. The paper reference is shown in the top left hand corner.

Attempt ALL questions using the spaces provided in the Question Paper.

Information for Candidates

You may use drawing equipment and coloured pencils.

All measurements are in millimetres unless otherwise stated.

Advice to Candidates

You are reminded of the importance of clear and orderly presentation in your answers.

Include diagrams where these are helpful.

Turn over

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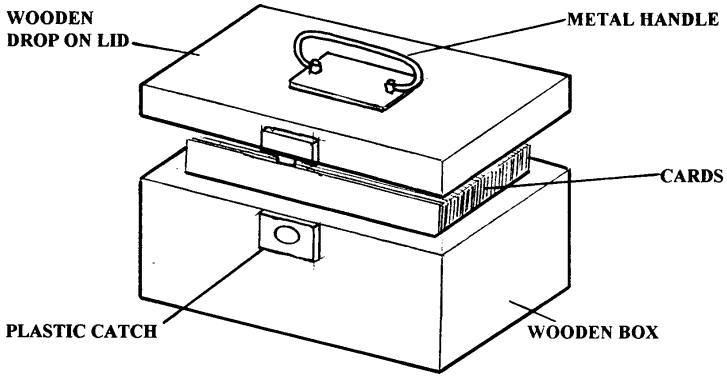
Answer ALL questions in the spaces provided.

Leave blank

1. The drawing below shows a container for storing address cards.



ADDITIONAL INFORMATION

The container is to be made of wood and will be used on an office desk.

(a) Two specification points for the container are:

- it must hold standard address cards which measure 140mm x 90mm;
- it must be easy to select cards from the container.

Give **three** more points of specification which could be included in the specification of this product. For each point, give a reason why it should be included.

1 .....

Reason .....

2 .....

Reason .....

3 .....

Reason .....

(6)

Leave blank

(b) Name the specific type of material suitable for making each of the following parts of the container.

(i) Wooden box

.....

(ii) Metal handle

.....

(iii) Plastic catch

.....

(3)

(c) Give **one** property associated with **one** of the materials you have named in (b) and explain how this property makes it suitable for this application.

Property .....

Explanation.....

.....

.....

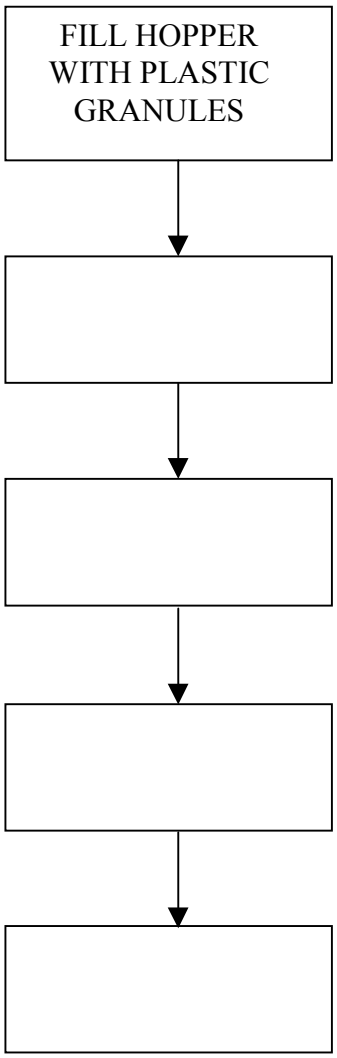
(4)

Leave blank

(d) The plastic catch is to be injection moulded in quantities of 1000.

Complete the diagram below to show the main stages in the injection moulding process.

The first stage has been done for you.



(5)

(e) The purpose of this desk top container is to store address cards and allow individual cards to be selected.

Describe how this design achieves its purpose.

.....

.....

.....

.....

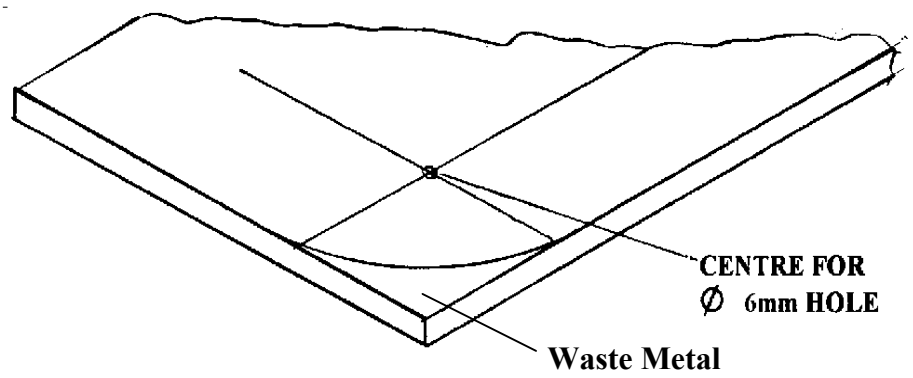
(4)

(Total 22 marks)

BLANK PAGE
TURN OVER FOR QUESTION 2

Leave blank

2. The drawing below shows a piece of metal marked out ready for drilling and shaping.



(a) (i) Add to the table below the tools used for marking out this piece of metal.

One tool has been named for you.

PROCESS	TOOL USED
Mark the centre of a hole	*Odd leg calipers*
Punch the centre of a hole	
Mark radius on corner	

(2)

(ii) Name **two** tools used to remove the waste metal and finish the radius.

1 .....

2 .....

(2)

(b) (i) Make a clear sketch of a pair of odd leg calipers and identify their key features.

(4)

(ii) Explain how the odd leg calipers would be used to mark the position of the centre of the 6mm diameter hole.

Leave blank

.....

.....

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.....

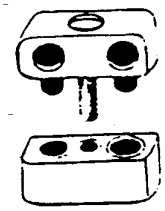
.....

(3)

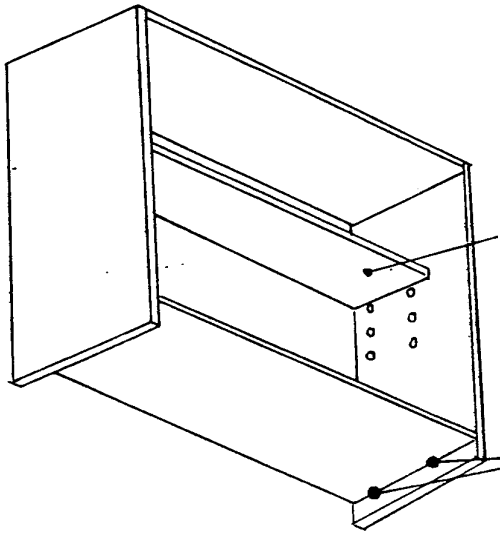
(Total 11 marks)

Leave blank

3. The drawing below shows one design for a self assembly book rack made from wood effect veneered chipboard. The book rack is sold as a flat-packed self assembly item. The detail shows the Knock Down (KD) fittings supplied with the book rack.



DETAIL OF KD FITTING



(a) The KD fitting is manufactured from a plastic material using the injection moulding process.

(i) Name a suitable plastic material for the KD fitting.

.....

(1)

(ii) Give **three** reasons for the manufacturer choosing injection moulding rather than machining the KD fitting from a solid piece of material.

1.....

2.....

3.....

(3)

(b) (i) Use an annotated sketch to show how the KD fitting is joined to one side and the base of the book rack.

(3)

(ii) Explain why this fitting is called a knock down fitting.

Leave blank

.....

.....

(2)

(c) The shelf position can be adjusted to three pre-drilled heights.

Make a clear drawing to show a suitable fitting that can be inserted in any of the pre-drilled holes to make the shelf height adjustable.

(2)

(Total 11 marks)

PAPER TOTAL 44 MARKS

END

DESIGN & TECHNOLOGY: RESISTANT MATERIALS TECHNOLOGY (3973/2F)
SHORT COURSE FOUNDATION TIER MARK SCHEME

Qu.	Prt Qu.	Sub Qu.	Detailed Possible Answers	Mark Alloc.	Sub. Total
1.	**(a)**	**(i)**	Name: Engineer's Hammer, Name: Try Square Name: Countersunk bit	**3x1**	
		(ii)	Use: striking punches/ forming metal/ peining rivets etc, Use: measuring and marking right angles. Use: producing a countersunk recesses	**3x1**	**(6)**
	(b)	**(i)**	Rivet drawn With round head	**1** **1**	**(2)**
		(ii)	Form dome on the rivet with hammer Mention of use of rivet set Mention of paper or similar to give suitable loose joint	**1** **1** **1**	**(3)**
					(11)
2	**(a)**	**(i)**	Material for axles, e.g. steel, aluminium, dowel	**2x1**	**(2)**
		(ii)	Material for wheels e.g. acrylic, nylon	**1**	**(1)**
		(iii)	Clear sketch of suitable axle fixing with notes: holds securely, alignment, axle free to turn, axle should not slip.	**4x1**	**(4)**
		(iv)	Sketch to show wheel held securely on axle with notes, e.g. crimped end, cap nut, threaded Explanation	**2** **2**	**(4)**
					(11)
3	**(a)**		Accept any three relevant points of specification and reasons eg Point: must be lightweight Reason: to ensure it is portable Point: must be easy to clean Reason: may become dusty/dirty Point: must be aesthetically pleasing Reason: needs to fit in with existing environment	**6x1**	**(6)**
	(b)	**(i)** **(ii)** **(iii)**	Material for box e.g. oak, mahogany, beech, pine, MDF Material for handle e.g. steel, aluminium (accept others) Material for catch, e.g. HIP, PVC (accept others)	**1** **1** **1**	**(3)**
	(c)		1 property suitable for selected material given, e.g. easy to clean, durable, light, finishes well Explanation of property ref application/ material .g. plastic catch self-lubrication and can fasten/ unfasten many times without maintenance	**1+3**	**(4)**

Qu.	Prt Qu.	Sub Qu.	Detailed Possible Answers	Mark Alloc.	Sub. Total
	(d)		4 stages for IJ moulding, e.g. *place mould*, heat granules, inject plastic, allow soak time, remove mould, *remove moudling* Correct sequence	**4x1** **1**	**(5)**
	(e)		Fitness for purpose e.g. the container is shallow/ there is sufficient clearance around to allow easy access to cards, the lid has sufficient depth to cover cards when closed, produced in large batches it will be relatively cheap, production process will ensure they are all identical	**2x2**	**(4)**
					(22)
			TOTAL FOR PAPER 44 MARKS		

DESIGN & TECHNOLOGY: RESISTANT MATERIALS TECHNOLOGY (3973/2H)
SHORT COURSE HIGHER TIER MARK SCHEME

Qu.	Prt Qu.	Sub Qu.	Detailed Possible Answers	Mark Alloc.	Sub. Total
1	**(a)**		Accept any three relevant points of specification and reasons eg Point: must be lightweight Reason: to ensure it is portable Point: must be easy to clean Reason: may become dusty/dirty Point: must be aesthetically pleasing Reason: needs to fit in with existing environment	**6x1**	**(6)**
	(b)	**(i)** **(ii)** **(iii)**	Material for box e.g. oak, mahogany, beech, pine, MDF Material for handle e.g. steel, aluminium (accept others) Material for catch, e.g. HIP, PVC (accept others)	**1** **1** **1**	**(3)**
	(c)		1 property suitable for selected material given, e.g. easy to clean, durable, light, finishes well Explanation of property ref application/ material .g. plastic catch self-lubrication and can fasten/ unfasten many times without maintenance	**1+3**	**(4)**
	(d)		4 stages for IJ moulding, e.g. *place mould*, heat granules, inject plastic, allow soak time, remove mould, *remove moudling* Correct sequence	**4x1** **1**	**(5)**
	(e)		Fitness for purpose e.g. the container is shallow/ there is sufficient clearance around to allow easy access to cards, the lid has sufficient depth to cover cards when closed, produced in large batches it will be relatively cheap, production process will ensure they are all identical	**2x2**	**(4)**
					(22)
2	**(a)**	**(i)**	Centre/ dot punch, dividers	**2x1**	**(2)**
		(ii)	Hacksaw, file	**2x1**	**(2)**
	(b)	**(i)**	Identifiable odd leg caliper drawn Hardened scriber OR odd leg	**2x2**	**(4)**
		(ii)	Odd leg held against edge of metal and line drawn Process repeated on second edge with same setting Intersection of lines is centre	**3x1**	**(3)**
					(11)

Qu.	Prt Qu.	Sub Qu.	Detailed Possible Answers	Mark Alloc.	Sub. Total
3	**(a)**	**(i)**	Nylon	**1**	**(1)**
		(ii)	Any 3 reasons from Repeatability, low cost, cost effective, reduces waste, speed.	**3x1**	**(3)**
	(b)	**(i)**	Clear sketch with notes to show sequene Locate and screw component to one half of joint, then second half, attached to first, attach second half to bottom	**3x1**	**(3)**
		(ii)	Machine screw which joins tow parts together is the only component which needs to be removed.	**2x1**	**(2)**
	(c)		Suitable shelf fitting drawn Capable of repositioning	**1** **1**	**(2)**
					(11)
			TOTAL FOR PAPER 44 MARKS		

DESIGN & TECHNOLOGY: RESISTANT MATERIALS TECHNOLOGY (3973)
SPECIFICATION GRID

PAPER 2F				
Quest	**Assessment objective tested**	**Content covered by question**	**Question style/type**	**Marks**
1	AO1	Preparing, processing and finishing materials.	Structured question on a theme.	**Total 11**
2	AO1	Classification and selection of materials and components.	Structured question on a theme.	**Total 11**
3	AO3	Design and market influence.	Product analysis – candidates are asked to analyse a product following the analysis process.	**Total 22**
PAPER 2H				
Quest	**Assessment objective tested**	**Content covered by question**	**Question style/type**	**Marks**
1	AO3	Design and market influence.	Product analysis – candidates are asked to analyse a product following the analysis process.	**Total 22**
2	AO1	Preparing, processing and finishing materials.	Structured question on a theme.	**Total 11**
3	AO1	Classification and selection of materials and components.	Structured question on a theme.	**Total 11**

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Summer 2000

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