

Candidate Name

Centre Number

Candidate  
Number

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**OXFORD CAMBRIDGE AND RSA EXAMINATIONS****General Certificate of Secondary Education****DESIGN AND TECHNOLOGY  
(SYSTEMS AND CONTROL TECHNOLOGY)****1957/1****PAPER 1 FOUNDATION TIER****Specimen Paper 2003**

1 hour

Additional materials:  
Formulae Sheet OCR (Tables 2)**TIME** 1 hour**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.

Show all your working out for calculations.

**INFORMATION FOR CANDIDATES**

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

Marks will be awarded for the use of correct conventions.

Dimensions are in millimetres unless stated otherwise.

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

Question Number	For Examiner's use only
<b>1</b>	
<b>2</b>	
<b>3</b>	
<b>4</b>	
<b>5</b>	
<b>TOTAL</b>	

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

1 Fig. 1 shows a bathroom adapted to suit a disabled person.

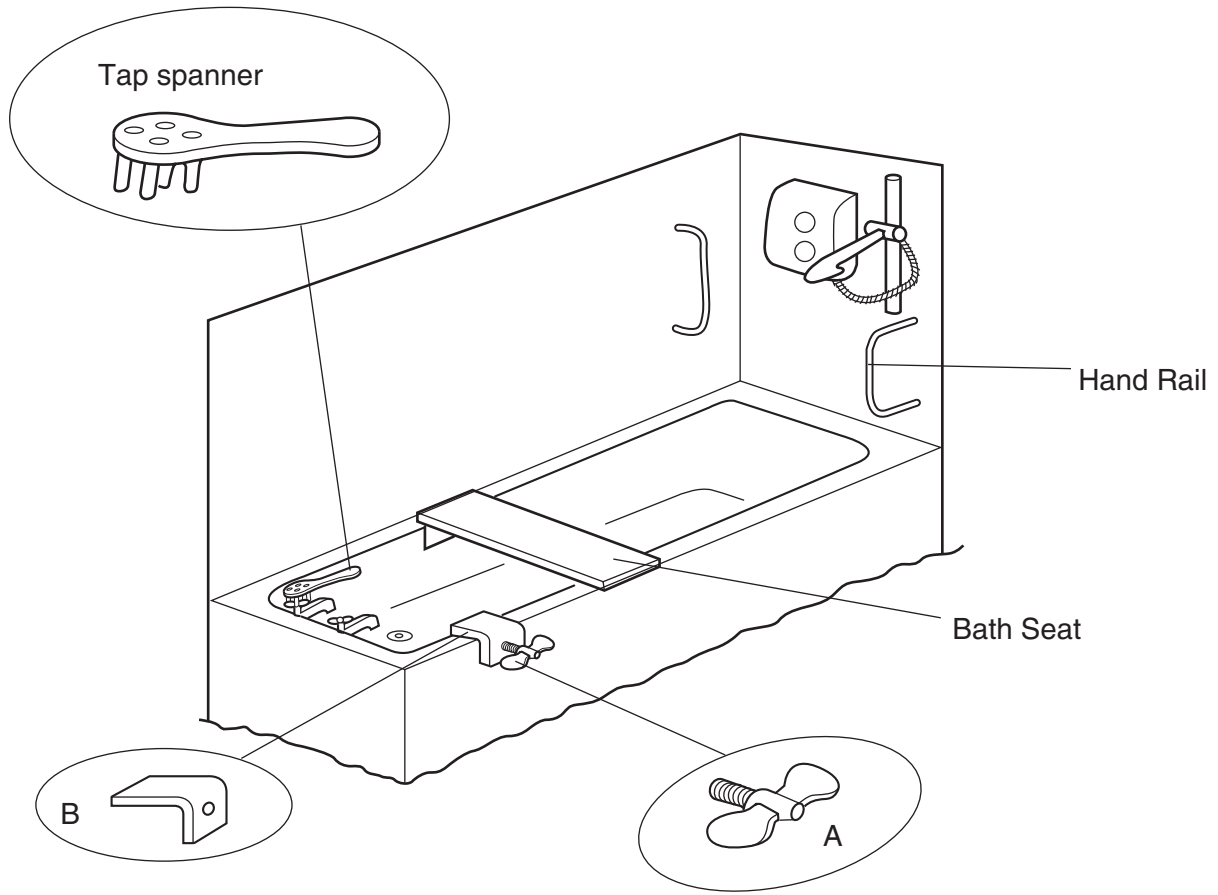


Fig. 1

(a) Complete the table below to give a suitable finish for each item.

Item	Material	Finish
Handrail	Mild steel tube	
Bath Seat	Plywood	
Tap spanner	Brass	

[3]

**(b)** A bracket (**B**) to support a water level alarm unit is held on the side of the bath by component **A**.

**(i)** Write the name of component **A** on the line below.

**A:** \_\_\_\_\_ [1]

**(ii)** Give **one** drawback of using component A in this situation.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ [1]

**(c)** The bracket **B** is produced in batches of 25 units. Explain how a jig could help to make all the brackets the same shape.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ [2]

**(d)** Using sketches and labels show another way that the alarm could be held on the side of the bath.

[3]

[Total marks : 10]

2 Fig. 2 shows a prototype bath seat made from 12 thick plywood.

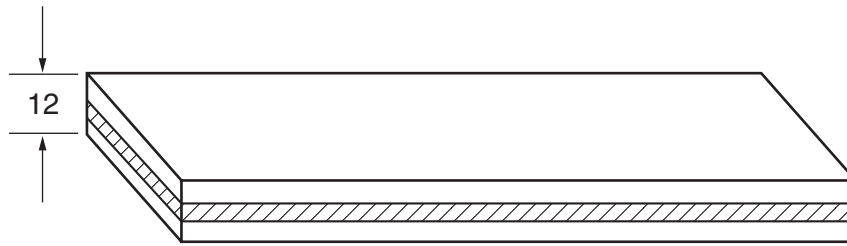


Fig. 2

- (a) (i) The seat was found to sag when someone sat on it.  
Use sketches and notes to show how the prototype seat could be improved to reduce the amount of sagging.

[2]

- (ii) The sides of the bath seat could be held together using KD fittings.

Explain what is meant by the term KD fitting.

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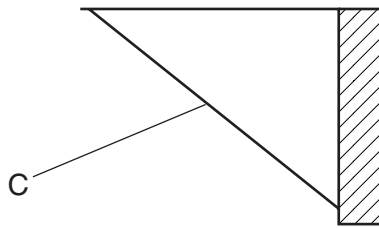
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[2]

- (iii) Sketch a suitable KD fitting that could be used to hold the bath seat together.

[2]

(b) Fig. 3 shows detail of the bath seat mounting bracket.



**Fig. 3**

Explain the structural purpose of part C.

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[2]

(c) State **two** reasons for selling the bath seat as a self assembly flat pack.

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[2]

[Total marks : 10]

3 Fig. 4 shows a circuit diagram for the water level alarm.

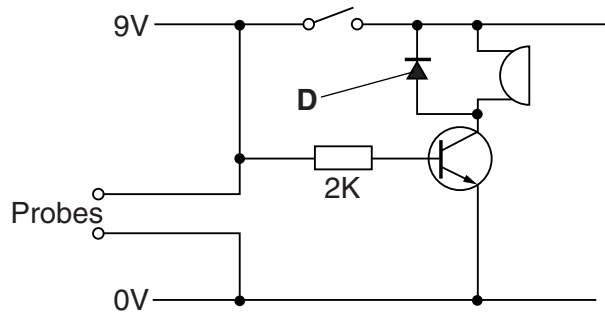


Fig. 4

(a) (i) Explain the purpose of component D.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_ [2]

(ii) State a suitable type of on/off switch for this product.

\_\_\_\_\_ [1]

(iii) Once the buzzer is activated in the circuit, it remains on until the circuit is switched off. Give **one** benefit of this arrangement and one drawback.

Benefit: \_\_\_\_\_

Drawback: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_ [2]

(b) The alarm uses a 9 V battery. A battery is a secondary source of energy. Explain what is meant by this term.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_ [2]

- (c) After the alarm has been used several times water has damaged the circuit.  
Use sketches and notes to show how the circuit could be protected from such damage.

[3]

[Total marks : 10]

4 Fig. 5 shows a shower height adjustment handle.

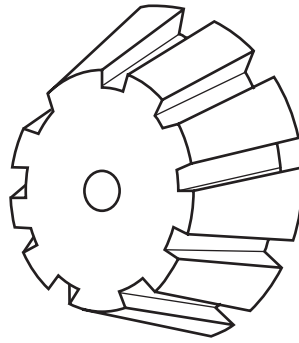


Fig. 5

(a) The shower adjustment handle is produced by repetitive flow production. Describe what is meant by the term repetitive flow.

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[2]

(b) From the list below underline the process best suited to manufacturing the shower adjustment handle.

Injection moulding,

Vacuum forming,

Machined from solid.

[1]

(c) The shower adjustment handle was designed using CAD systems. Describe **one** benefit to the designer of using CAD.

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[2]



- (d) Fig. 6 shows a set screw used in the assembly of the shower unit.  
The setscrew could be made using CAM.

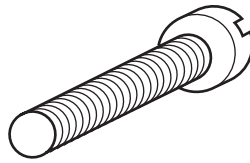


Fig. 6

- (i) Give **one** benefit, other than costs, to the manufacturer of using CAM systems.

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[1]

- (ii) Give **one** benefit, other than cost, to the consumer of the setscrew being made using CAM systems.

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[1]

- (iii) Give **one** example of the use of CAD/CAM to make a one off artefact.

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[1]

- (e) When designing the shower unit the designer wished to make the product environmentally friendly.

Describe one way in which the product could be so made.

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[2]

[Total marks : 10]

5 Fig. 7 shows a tap spanner used to make turning a tap on and off easier.

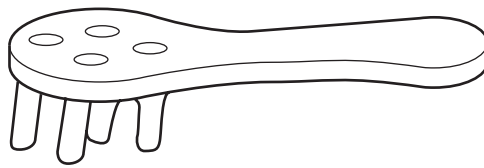


Fig. 7

(a) Explain how the spanner makes turning the tap on and off easier.

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[2]

(b) Add **three** design specification points to the list given below.

- must not corrode,
- must be attractive to look at,
- must be appropriately priced for the intended users,

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[1]
- ---

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[1]
- ---

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[1]

(c) Explain how a designer would use anthropometric data when designing a tap spanner.

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[2]

(d) The tap spanner is being manufactured in batches of 25.  
Describe a way of assuring quality of the spanners.

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[2]

(e) State **one** physical property of the material used for the spanner that would be important to its function.

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[1]

[Total marks : 10]

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**General Certificate of Secondary Education**

**DESIGN AND TECHNOLOGY**  
**(SYSTEMS AND CONTROL TECHNOLOGY)**

PAPER 1 FOUNDATION TIER

MARK SCHEME

**Specimen Paper 2003**

**1957/1**

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**This mark scheme consists of 5 printed pages and 1 cover sheet.**

<b>1</b>	<b>(a)</b> PVC powdercoat, Paint Gloss paint/varnish		[3]	
	<b>(b) (i)</b> 'A': Wingnut, Thumbscrew		1 x [1]	[1]
	<b>(ii)</b> Damage bath			[1]
	<b>(c)</b> Consistent forming of shape, Easier to make some shape, Quick yet accurate forming,		1 x [2]	[2]
	<b>(d)</b> 1. Sketches and labels used well?		[1]	
	2. Idea appropriate to situation?		[1]	
	3. Idea feasible?		[1]	
			3 x [1]	[3]
				[Total marks : 10]
<b>2</b>	<b>(a) (i)</b> Appropriate sketches  Reinforcing strip		2 x [1]	[2]
	<b>(ii)</b> KD means knock down collapsible / self assembly		[1] [1]	[2]
	<b>(iii)</b> Suitable sketch			[2]
	<b>(b)</b> 'C' is a web or gusset [1] that triangulates the bracket to make it more rigid [1].		2 x [1]	[2]
	<b>(c)</b> Takes less space Ease of transport		[1] [1]	[2]
				[Total marks : 10]

<b>3 (a) (i)</b>	To prevent damage [1] to TR1 from back e.m.f. [1]	2 x [1]	[2]
<b>(ii)</b>	SPST [1] Toggle [1] Slider [1]	1 x [1]	[1]
<b>(iii)</b>	Benefit: demands user action D.back: batteries will fail	[1] [1]	[2]
<b>(b)</b>	Not a direct source of energy [1] an energy conversion is needed to release stored energy [1]	2 x [1]	[2]
<b>(c)</b>	1. Sketches and labels used? 2. Is idea appropriate to situation? 3. Is idea feasible?	[1] [1] [1]	[3]
			[Total marks : 10]

<b>4 (a)</b>	Large numbers of identical products made as cheaply as possible on a continuous basis.	[1] [1]	
		2 x [1]	[2]
<b>(b)</b>	<u>Injection moulding</u>	1 x [1]	[1]
<b>(c)</b>	Changes can be made quickly and easily.	[1]	
	Changes can be modelled on screen for visualisation.	[1]	
		2 x [1]	[2]
<b>(d) (i)</b>	Quality assurance Product consistency	[1] [1]	
		1 x [1]	[1]
<b>(ii)</b>	Confidence in product Ensured accuracy	[1] [1]	
		1 x [1]	[1]
<b>(iii)</b>	Modelling of scaled prototypes Toolmaking	[1] [1]	
		1 x [1]	[1]
<b>(e)</b>	Use recyclable materials Ensure energy efficiency of plant keep materials down to bare minimum	[1] [1] [1]	
		2 x [1]	[2]
			[Total marks : 10]



<b>5 (a)</b>	Provides improved leverage [1] and is easier to grip [1]	2 x [1]	[2]
<b>(b)</b>	easy to grip safe to use must not damage tap must fit a range of taps lightweight	[1] [1] [1] [1] [1]	[3]
<b>(c)</b>	To design [1] and form the hand grip anthropometric data would be needed	[1]	[2]
<b>(d)</b>	Checking against templates at all stages of the production run	[1] [1]	[2]
<b>(e)</b>	Good tensile strength Toughness Flexibility Elasticity	[1] [1] [1] [1]	[1]
			[Total marks : 10]

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