

Candidate Name

Centre Number

Candidate
Number

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**OXFORD CAMBRIDGE AND RSA EXAMINATIONS****General Certificate of Secondary Education****DESIGN AND TECHNOLOGY
(INDUSTRIAL TECHNOLOGY)****1959/3****PAPER 3 FOUNDATION TIER****Specimen Paper 2003**

1 hour 15 minutes

Candidates answer on the question paper.

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.

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.


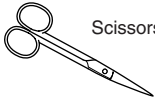

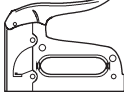

FOR EXAMINER'S USE	
1	
2	
3	
4	
5	
TOTAL	

This specimen question paper consists of 9 printed pages and 3 blank pages.

- 1 Different types of mechanical systems are used in many products found in the home at school or in industry.

The table below shows 5 products that use mechanical systems to perform particular functions.

- (a) Complete the table by ticking **one** mechanical system that can be found in each of the products.

	Gear	Pulley	Lever	Linkage
 Bicycle				
 Scissors				
 Drilling machine				
 Wall stapler				
 Piano				

[5]

- (b) Fig. 1 shows a simple gear and a simple pulley arrangement.

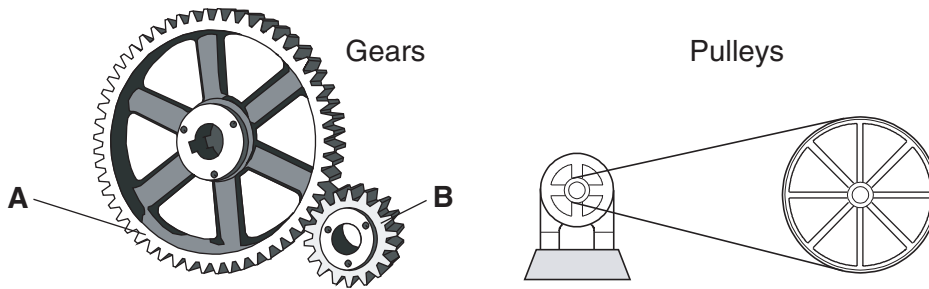


Fig. 1

- (i) State which of the gears A or B, when turned, would move the faster.

_____ [1]

- (ii) State why one gear would move faster than the other.

 _____ [2]

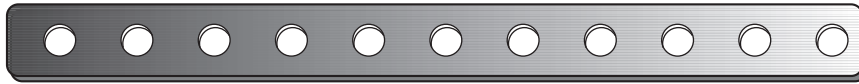
(iii) State one advantage a gear system has over a pulley system.

_____ [1]

(iv) State one advantage a pulley system has over a gear system.

_____ [1]

2 Fig. 2 shows part of a child's construction set.



(actual size)

Fig. 2

The part is made of metal and is intended to be safe for older children to use and should not corrode.

The part is to be produced in large quantities as each construction kit contains 30 of these components.

(a) State a suitable material for the production of the parts.

_____ [1]

(b) State two ways of ensuring that the parts are safe for children to use.

_____ [2]

(c) (i) Explain why the holes on the part should be equally spaced.

_____ [2]

(ii) Using notes and sketches show a design for a simple jig that will ensure that the holes can be drilled equally spaced on a single part.

[3]

(d) (i) State another method for producing the holes other than drilling.

_____ [1]

(ii) State one advantage for using your chosen method instead of drilling.

_____ [1]

3 Fig. 3 shows a prototype design for a novelty elephant nutcracker.

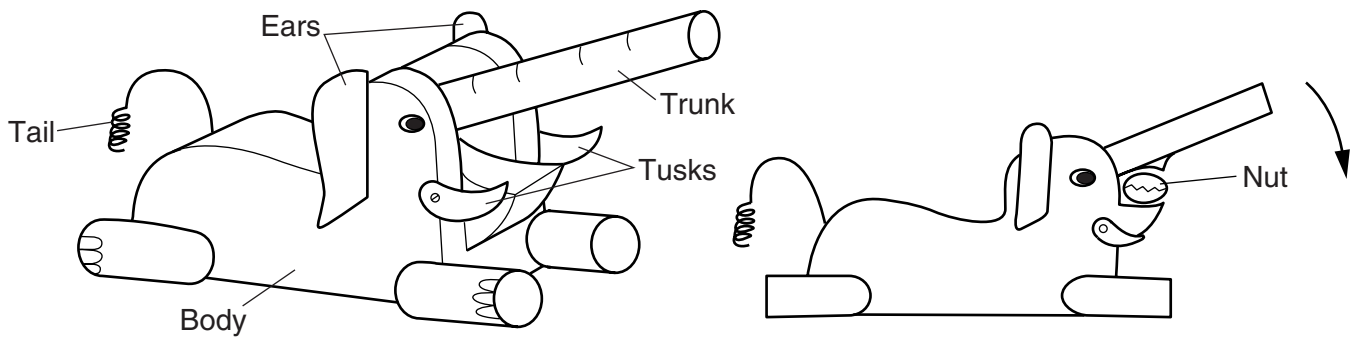


Fig. 3

The prototype is made up of several different materials.

(a) Complete the table below by selecting a different material for each of the components from the list provided. Give a desirable property for the material used to make the tusks.

Mild steel, cast aluminium, acrylic, leather, balsa wood, copper wire.

	Component	Material	Property
A	Body		Heavy
B	Trunk		Tough
C	Tail		Flexible
D	Tusks		
E	Ears		Soft

[6]

Before designing the prototype nutcracker the designer would develop a design specification.

(b) State four of the design features that the designer would need to include in the original specification for the novelty nutcracker.

Feature 1 _____ [1]

Feature 2 _____ [1]

Feature 3 _____ [1]

Feature 4 _____ [1]

4 Fig. 4 shows two different designs for a G-cramp.

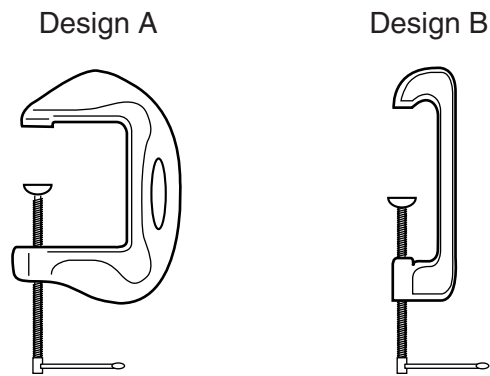


Fig. 4

(a) (i) State an advantage in using design A rather than design B.

_____ [1]

(ii) State an advantage in using design B rather than design A.

_____ [1]

Fig. 5 shows a view of the main body of design A. It is made from aluminium using the sand casting process.

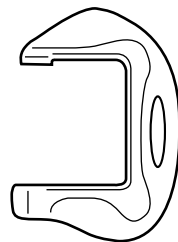


Fig. 5

(b) Complete the chart below by filling in the missing steps in the sand casting process. Steps 1 and 6 have been completed for you.

Step 1	Make a split pattern suitable for the body of the G-cramp.
Step 2	
Step 3	
Step 4	
Step 5	
Step 6	Clean up the finished casting.

[4]

(c) (i) Explain why it is necessary to use a split pattern for producing the G-cramp body.

_____ [1]

(ii) Using notes and sketches show a design for a split pattern suitable for producing the body of the G-cramp using the sand casting process.

[3]

- 5 A group of railway enthusiasts are constructing a miniature railway.
The railway will be able to take small carriages to carry young children around the track.

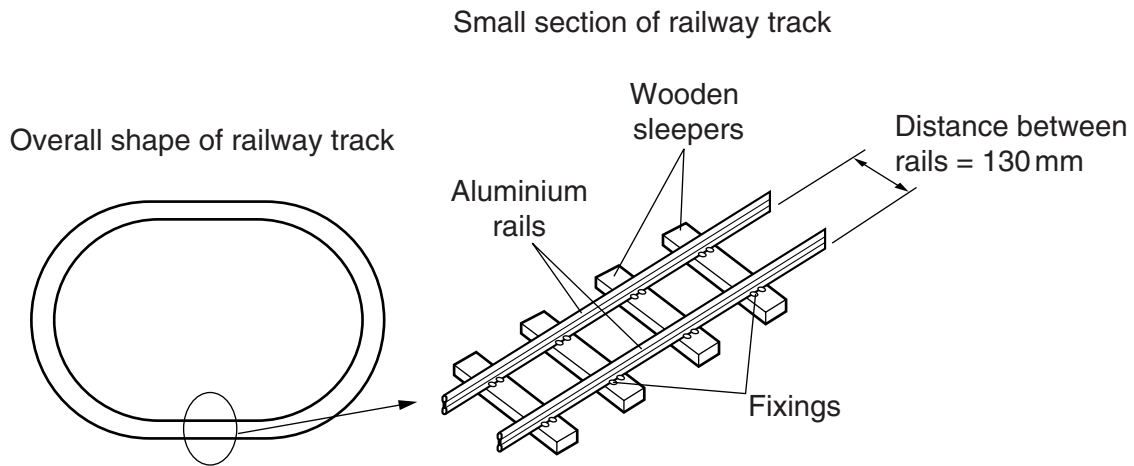


Fig. 6

Fig. 6 shows an overall view of the track and a small close up section.
It is very important that the aluminium rails are kept at an equal distance apart for the whole of the railway track.

- (a)** Explain why it is necessary to keep the rails apart at an equal distance.

[2]

It becomes more difficult to maintain the equal distance around the bends of the track.

- (b)** Using notes and sketches show your design for a jig that can be used to help keep the rails at an equal distance apart around the bends of the track.

[4]

Fig. 7 shows a close up view and a cross section view of one of the wooden sleepers.

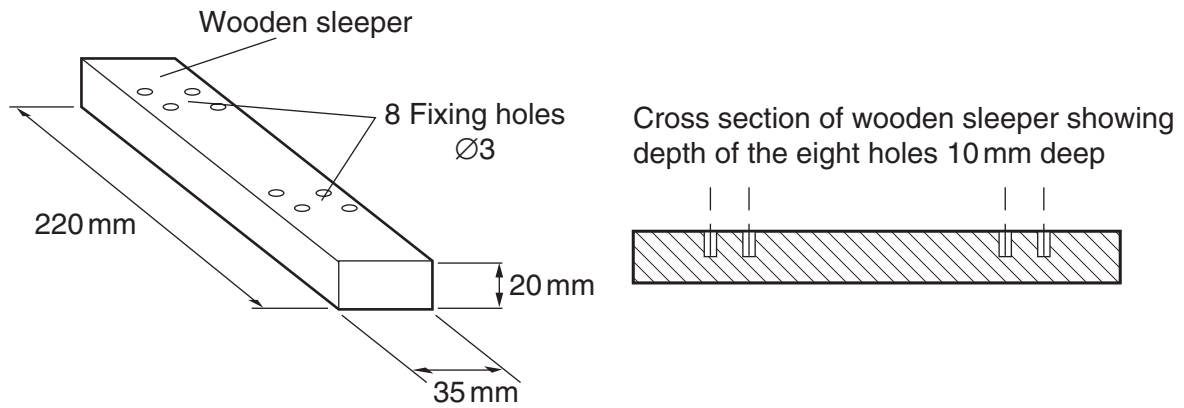


Fig. 7

400 of these sleepers need to be manufactured in the construction of the railway.

The sleepers are supplied cut to size and ready for drilling.

It is important that the holes are accurately drilled in position and depth.

- (c) (i)** Using notes and sketches show a design for a device that will allow accurate positioning of the holes.

[2]

- (ii)** Using notes and sketches show your method for maintaining accurate depth of drilling of the sleepers.

[2]

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Oxford Cambridge and RSA Examinations

General Certificate of Secondary Education

DESIGN AND TECHNOLOGY (INDUSTRIAL TECHNOLOGY)
PAPER 3 FOUNDATION TIER

1959/3

MARK SCHEME

Specimen Paper 2003

Question	Answer	Total Marks Available
1(a)	Bicycle – Gear / Lever / Linkage Scissors – Lever Drill – Pulley / Lever Stapler – Lever/ linkage Piano – Linkage/ lever	5
1(b) (i)	B	1
(ii)	Reference to distance travelled and gear ratio. (fewer teeth)	2
(iii)	No slippage. Change of direction or suitable response.	1
(iv)	Distance apart. Cheaper to produce or suitable response.	1
		Total 10

2(a)	Stainless steel. Aluminium.	1
2(b)	Remove all sharp edges. Round all corners. (1 mark each)	2
2(c) (i)	Ease of construction. Ease and cost of production. 1 mark for each answer	2
(ii)	Location and spacing – 1 mark Ease of use – 1 mark Level of communication – 1 mark	3
2(d) (i)	Punched or suitable response.	1
(ii)	Speed of production.	1
		Total 10

Question	Answer	Total Marks Available
3(a)	Body – Cast aluminium Trunk – Mild steel Tail – Copper wire Tusks – Acrylic – Hard / shiny/ coloured. (1 mark each) Ears – Leather	6
3(b)	Safe to use. Able to crack a range of nuts. Identifiable theme. Easy to use. Easy to maintain. Any four 1 mark each.	4
		Total 10

4(a) (i)	Greater reach of jaws	1
(ii)	Able to use in restricted spaces	1
4(b)	Step 2 – Encase pattern in casting sand Step 3 – Remove pattern leaving impression in sand Step 4 – Pour in the molten aluminium Step 5 – Leave to cool and remove casting from sand	4
4(c) (i)	Allows easy removal from sand. Ability to split mould. Or suitable response.	1
(ii)	Tapered sides. Location pegs. Radiused corners. (1 mark each)	3
		Total 10

Question	Answer	Total Marks Available
5(a)	Constant gauge. Limited tolerance.	2
5(b)	Way of spacing rails constantly – 1 mark Allowing for curvature of rails – 1 mark Reference to outer and inner radius – 1 mark Level of communication – 1 mark	4
5(c) (i)	Ease of location onto sleeper – 1 mark Ease of location holes – 1 mark	2
(ii)	Method showing accurate depth registration – 1 mark Ease for repeated use – 1 mark	2
		Total 10

Total marks: 50