

Write your name here	
Surname	Other names
Centre Number	Candidate Number
Edexcel GCE	
Design and Technology Product Design: Resistant Materials Technology Advanced Subsidiary Unit 2: Design and Technology in Practice	
Tuesday 19 May 2009 – Morning Time: 1 hour 30 minutes	Paper Reference 6RM02/01
You do not need any other materials.	Total Marks

Instructions

- Use **black** ink or ball-point pen.
- If pencil is used for diagrams/sketches it must be dark (HB or B). Coloured pens, pencils and highlighter pens must not be used.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
– *there may be more space than you need.*

Information

- The total mark for this paper is 70.
- The marks for **each** question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*
- You will be assessed on your ability to organise and present information, ideas, descriptions and arguments clearly and logically, including your use of grammar, punctuation and spelling.

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

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Answer ALL the questions. Write your answers in the spaces provided.

1 Figure 1 shows seats which have been manufactured using rotational moulding.



Figure 1

(a) Give **two** reasons why rotational moulding was chosen as the best method for manufacturing these seats.

(2)

1

2

(b) Describe, using notes and/or sketches, the rotational moulding process.

(6)

Blank space for describing the rotational moulding process, including notes and/or sketches.



2 The Health and Safety Executive (HSE) sets the standards for risk assessment when using machinery.

Figure 2 shows a pillar drill.



Figure 2

(a) Give **three** safety checks which should be made prior to using a pillar drill.

(3)

1

2

3

(b) Explain **two** reasons why the use of Computer Numerically Controlled (CNC) machines is generally safer than the use of manually operated machines.

(4)

1

2



(c) The use of Computer Numerically Controlled (CNC) machines is particularly suited to batch production.

Give **five** benefits of using CNC machines for batch production.

(5)

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(Total for Question 2 = 12 marks)

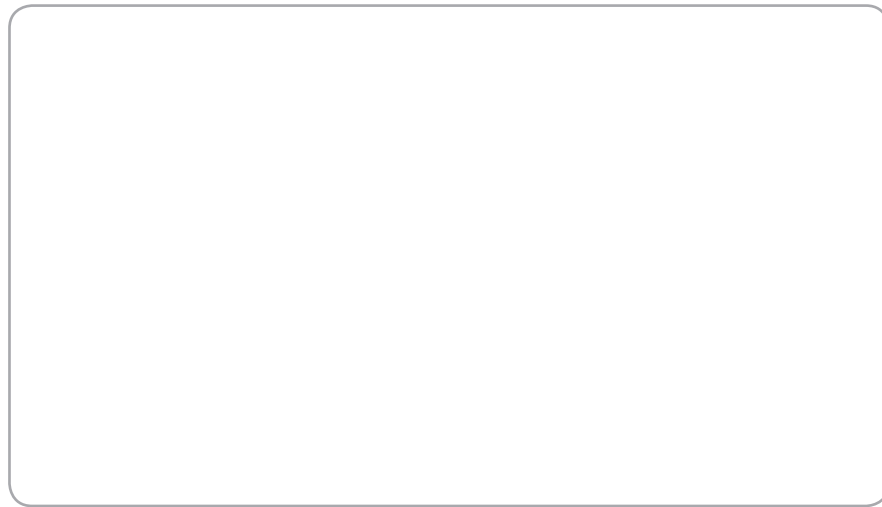


- 3** (a) After timber is felled, it is converted into usable sections by either through and through (slab) sawing, or quarter sawing.

Draw a cross sectional diagram to show how a log would be divided up by each method.

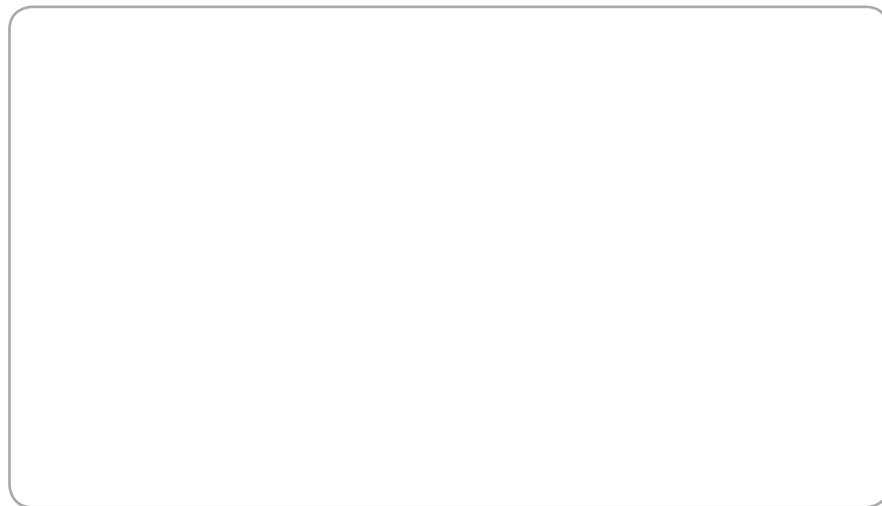
- (i) Through and through (slab) sawing.

(1)

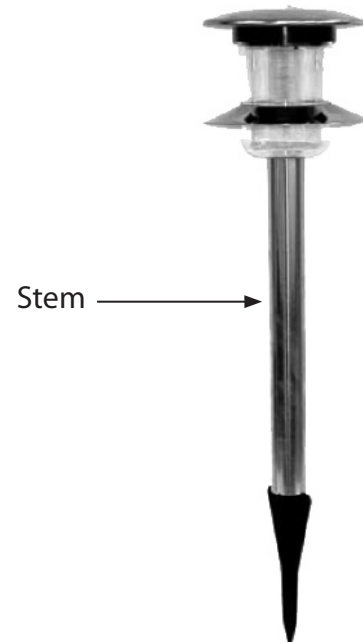


- (ii) Quarter sawing.

(1)



4 Figure 3 shows an outdoor solar light which is made predominantly from stainless steel. The light is designed to be pushed into the ground.



(a) Explain **two** reasons why stainless steel is a suitable material for the stem of the solar light.

(4)

1

2



5 Quality control systems are used in manufacturing processes.

(a) Explain what is meant by the term 'quality control'.

(4)

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(b) The kitemark is displayed on some products.

Outline what the Kitemark signifies to consumers.

(2)

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(c) Quality control is a feature of total quality management (TQM). Explain **two** further features of TQM.

(4)

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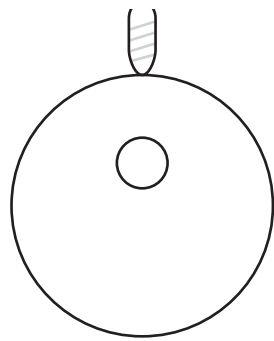
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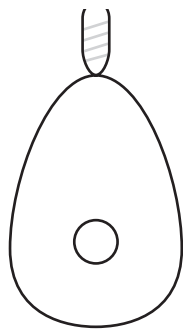
(Total for Question 5 = 10 marks)



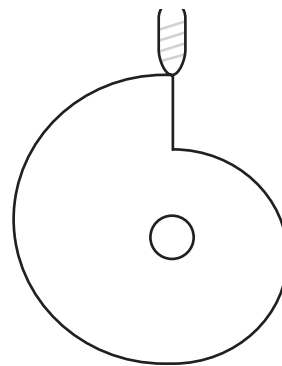
6 Figure 4 shows the profiles of three types of cam which all generate reciprocating motion in their respective followers.



Eccentric (circular) cam



Pear shaped cam



Snail cam

Figure 4

(a) Describe the characteristic movement each cam generates in its follower.

(i) Eccentric (circular) cam

(2)

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(ii) Pear shaped cam

(2)

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(iii) Snail cam

(2)

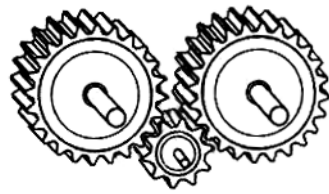
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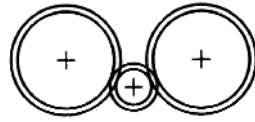
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(b) Figure 5 shows a diagram and schematic drawing of a simple gear train.



Idler gear



Schematic drawing

Figure 5

(i) Explain the reason for using an idler gear in this gear train.

(2)

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(ii) Draw a schematic drawing of a compound gear train showing direction of rotation for all gears.

(2)

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(Total for Question 6 = 10 marks)



(b) Quantum tunnelling composites (QTCs) change from being electrical insulators to electrical conductors depending on the pressure applied to them.

Give **three** advantages of using QTCs.

(3)

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(Total for Question 7 = 8 marks)

TOTAL FOR PAPER = 70 MARKS



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