

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

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2

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(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)

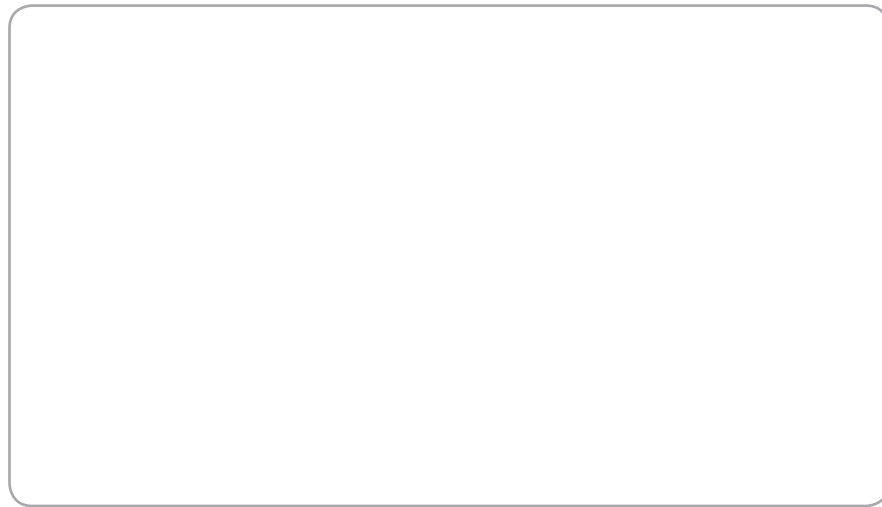


- 3** (a) After timber is felled, it is converted into usable sections by either through and through (slab) sawing, or quarter sawing.

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

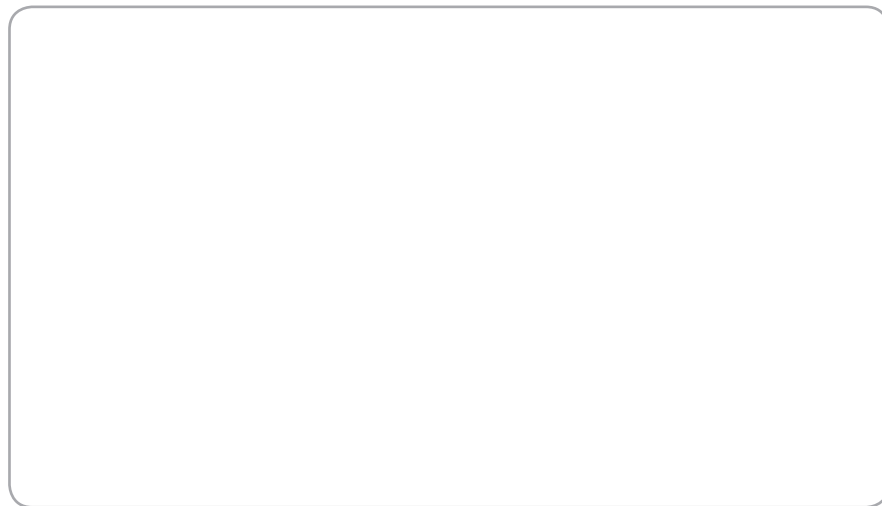
- (i) Through and through (slab) sawing.

(1)



- (ii) Quarter sawing.

(1)



(b) Discuss the advantages and disadvantages of quarter sawing compared with through and through (slab) sawing as a method of converting timber.

(6)

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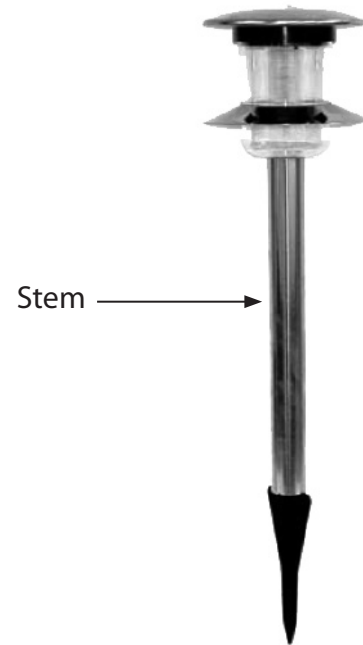
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(Total for Question 3 = 8 marks)



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)

1

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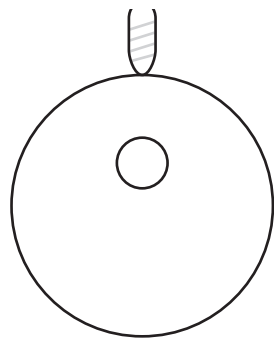
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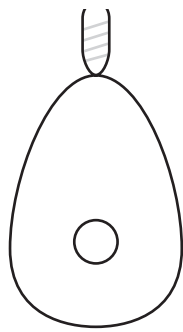
(Total for Question 5 = 10 marks)



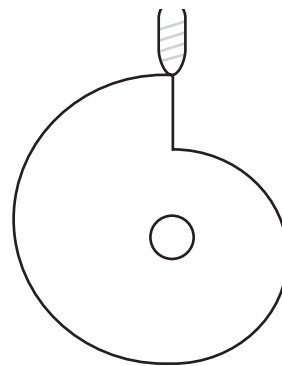
6 Figure 4 shows the profiles of three types of cam which all generate reciprocating motion in their respective followers.



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)

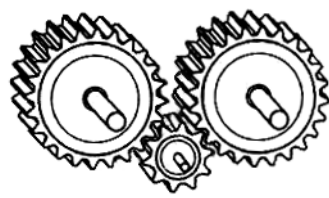
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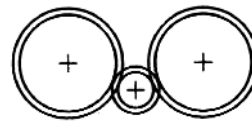
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(b) Figure 5 shows a diagram and schematic drawing of a simple gear train.



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)



7 Solar panels are increasingly being used as an alternative to fossil fuels for providing domestic electrical energy.

(a) Discuss the advantages and disadvantages of using solar panels compared with fossil fuels for this purpose.

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(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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