

Write your name here

Surname

Other names

Pearson
Edexcel GCSE

Centre Number

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Candidate Number

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Design and Technology

Unit 2: Knowledge and Understanding of Resistant Materials Technology

Thursday 14 June 2018 – Afternoon
Time: 1 hour 30 minutes

Paper Reference

5RM02/01

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 80.
- The marks for **each** question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed
– *you should take particular care on these questions with your spelling, punctuation and grammar, as well as the clarity of expression.*

Advice

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

Turn over ►

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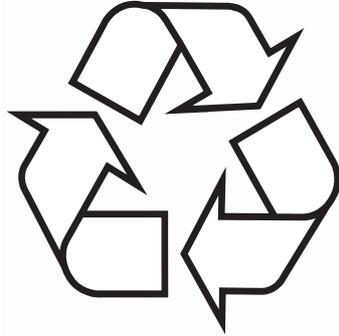


Pearson

Answer ALL questions.

Some questions must be answered with a cross in a box ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

1 Which **one** of the four Rs does the logo below indicate?



- A Recover
- B Reduce
- C Reuse
- D Recycle

(Total for Question 1 = 1 mark)

2 Which **one** of the processes below involves the use of heat?

- A Soldering
- B Threading
- C Pop riveting
- D Knock down fittings

(Total for Question 2 = 1 mark)

3 Which type of manufactured board is made up of several thin layers joined together at right angles?

- A Chipboard
- B Hardboard
- C Medium density fibreboard (MDF)
- D Plywood

(Total for Question 3 = 1 mark)

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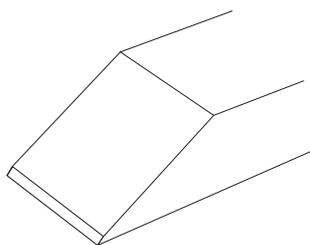
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4 Which **one** of the following materials is an alloy?

- A Copper
- B Zinc
- C Brass
- D Aluminium

(Total for Question 4 = 1 mark)

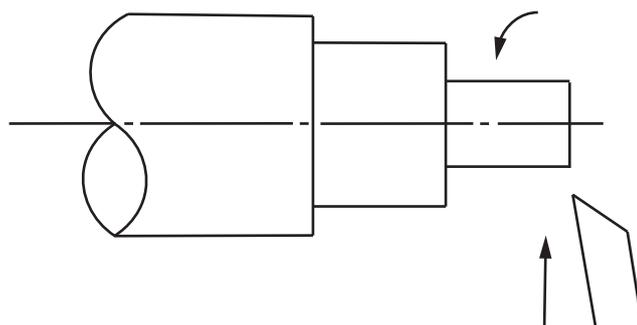
5 Which type of chisel is shown below?



- A Mortise
- B Cold
- C Bevel edge
- D Gouge

(Total for Question 5 = 1 mark)

6 Which turning process is shown in the diagram below?

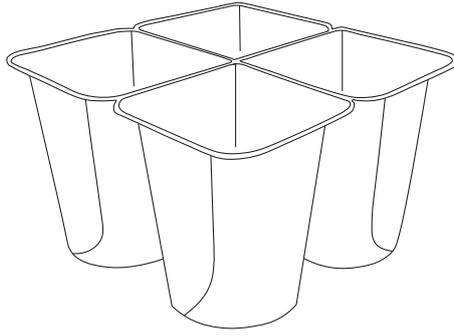


- A Knurling
- B Parting off
- C Facing off
- D Taper turning

(Total for Question 6 = 1 mark)



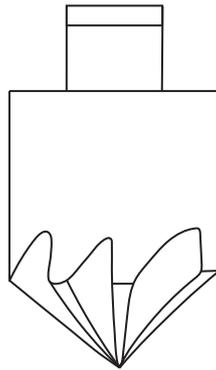
7 Which **one** of the following processes would be used to manufacture yoghurt pots?



- A Injection moulding
- B Extrusion
- C Blow moulding
- D Vacuum forming

(Total for Question 7 = 1 mark)

8 Which type of drill is shown below?



- A Twist
- B Countersink
- C Masonry
- D Flat

(Total for Question 8 = 1 mark)

9 Which **one** of the following is a smart material?

- A Shape memory alloy (SMA)
- B Medium density fibreboard (MDF)
- C Stainless steel
- D Polyester resin

(Total for Question 9 = 1 mark)



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10 Which property is described below?

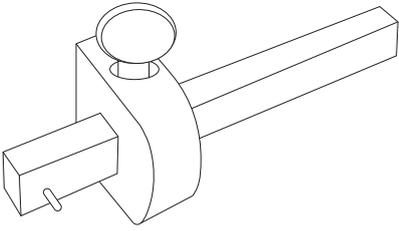
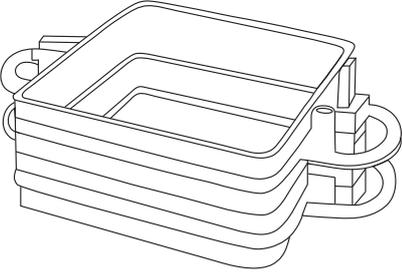
The ability of a material to withstand sudden and shock loading without fracturing.

- A** Ductility
- B** Toughness
- C** Hardness
- D** Malleability

(Total for Question 10 = 1 mark)



11 (a) Complete the table below by giving the missing names and uses.

Tools/Equipment	Name	Use
	<p>First Aid kit</p>	<p>(1)</p>
	<p>(1)</p>	<p>Protect hearing in the workshop</p>
	<p>Marking gauge</p>	<p>(1)</p>
	<p>(1)</p>	<p>For holding a pattern/ packing sand into when casting</p>

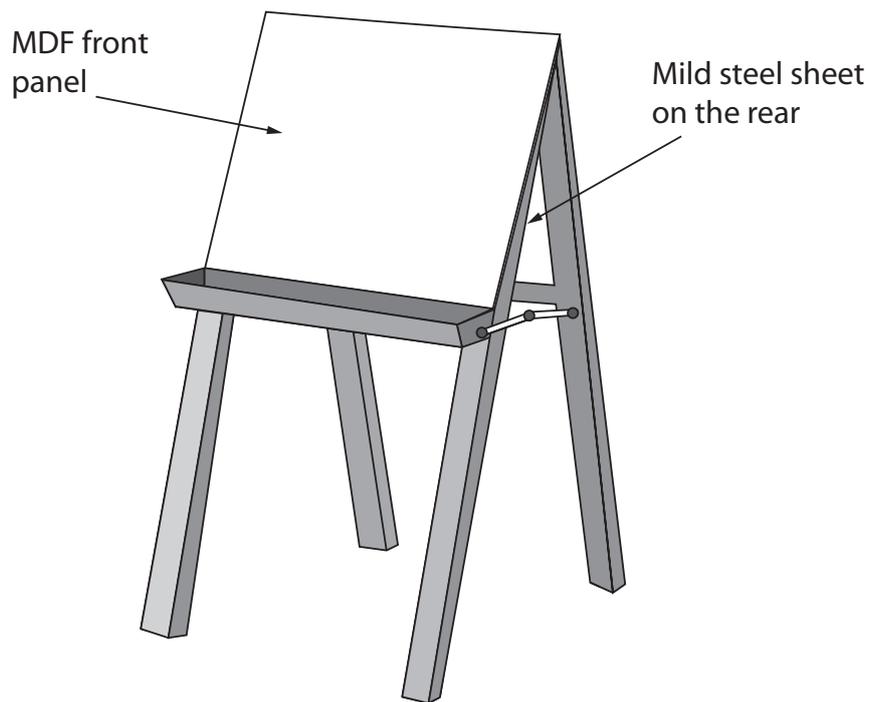
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(b) The drawing below shows a child's painting and drawing stand.



(i) Give **two** advantages of using medium density fibreboard (MDF) for the front panel of the painting and drawing stand.

(2)

1

2

MDF can be cut and sanded in the school workshop.

(ii) Give **three** health and safety risks of cutting and sanding MDF in the school workshop.

(3)

1

2

3



(iii) Explain **two** advantages of using MDF for the board rather than hardboard.

(4)

1

.....

2

.....

(c) The other side of the child's painting and drawing stand is made from mild steel sheet that is painted.

(i) Name **two** other appropriate finishes that could be applied to the mild steel sheet.

(2)

1

2

(ii) Explain **two** reasons for applying a finish to the mild steel sheet.

(4)

1

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(Total for Question 11 = 19 marks)

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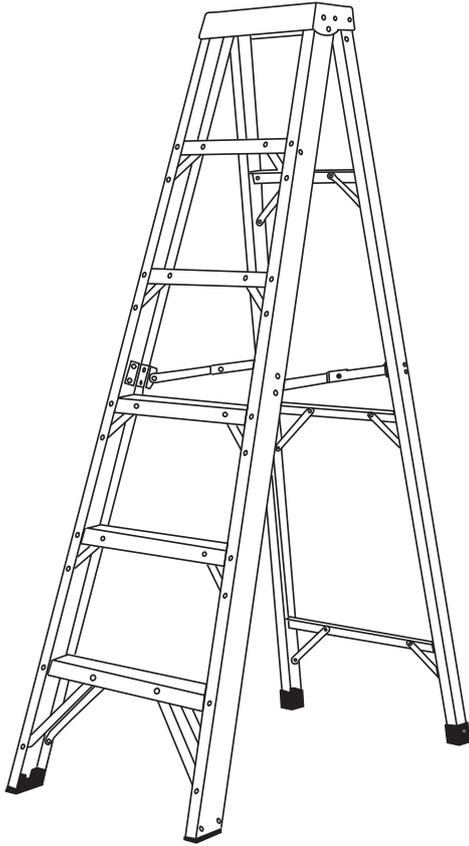
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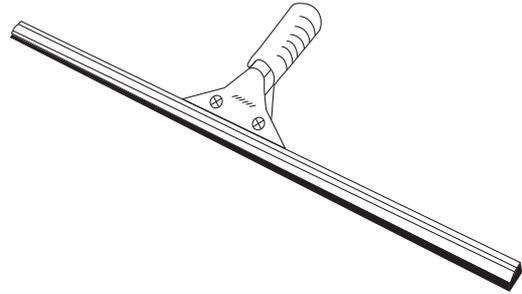
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12 You have been asked to design a step ladder attachment for a window cleaner.



Step ladder 500 mm wide



Window squeegee 300 mm long

The specification for the step ladder attachment is that it must:

- attach to the ladder
- provide a method of holding some water
- provide a method of storing cloths
- include a non-slip surface for resting a mobile phone on
- be easy to carry when detached from the ladder
- hold a window squeegee safely
- be made from waterproof materials
- be made using processes available in the school workshop.

In the spaces opposite, use sketches and, where appropriate, brief notes to show **two different** design ideas for the step ladder attachment that meet the specification points above.

Candidates are reminded that if a pencil is used for diagrams/sketches it must be dark (HB or B).

Coloured pens, pencils and highlighter pens must **not** be used.



Design idea 1

(8)

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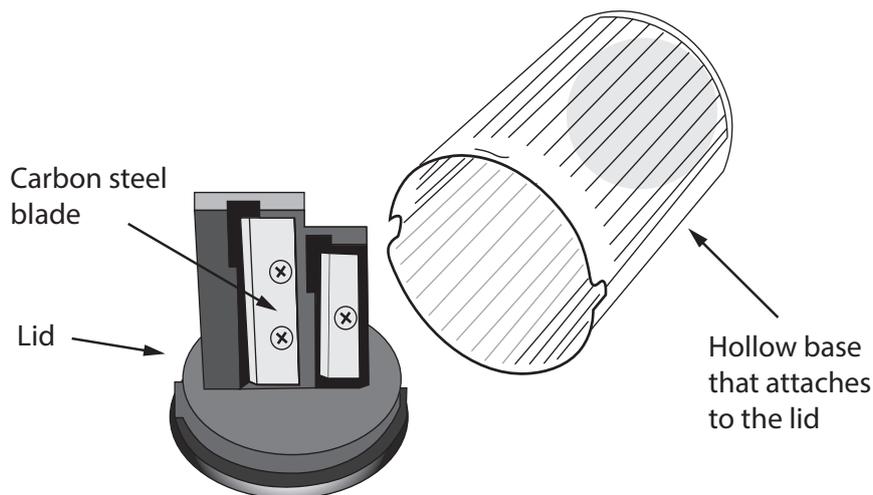
Design idea 2

(8)

(Total for Question 12 = 16 marks)



13 The drawing below shows a pencil sharpener.



- (a) (i) Give **two** properties of carbon steel that make it suitable for the blade of the pencil sharpener.

(2)

1

2

- (ii) Describe **one** reason why carbon steel is a better choice of metal for the blade rather than aluminium.

(2)

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- (b) The blade of the pencil sharpener has been heat treated.

Explain **one** reason for heat treating the blade of the pencil sharpener.

(2)

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(c) Explain why the pencil sharpener is successful in meeting the following specification points:

(i) easy to sharpen different sized pencils

(2)

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(ii) collecting the waste produced.

(2)

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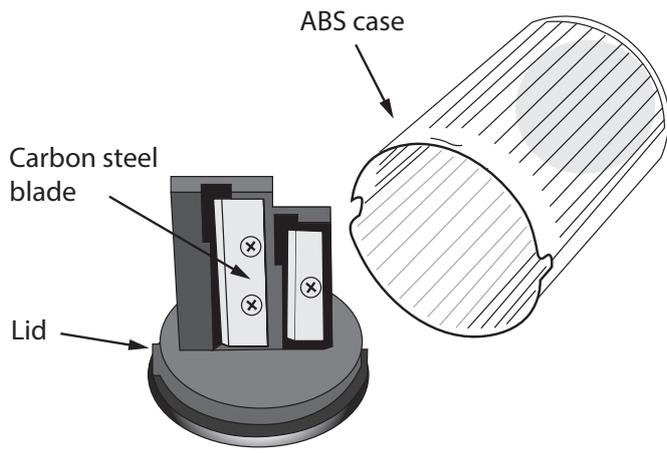
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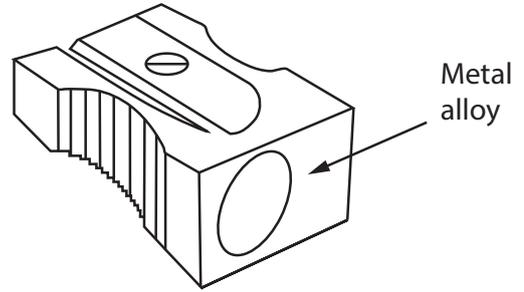
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*(d) The images below show two different types of pencil sharpener.



Pencil sharpener A



Pencil sharpener B

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Evaluate pencil sharpener A in comparison to pencil sharpener B in terms of form, materials and components.

(6)

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(Total for Question 13 = 16 marks)



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14 (a) Give **three** risks associated with the use of glass reinforced plastic (GRP) in the school workshop.

(3)

- 1
- 2
- 3

GRP is a composite material.

(b) Explain what is meant by the term 'composite'.

(2)

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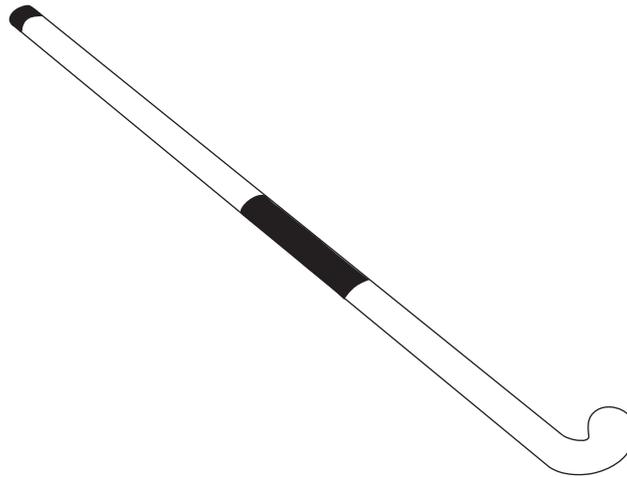


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The drawing below shows a hockey stick.



The hockey stick is manufactured from GRP.

(c) Describe **two** advantages of manufacturing the hockey stick from GRP.

(4)

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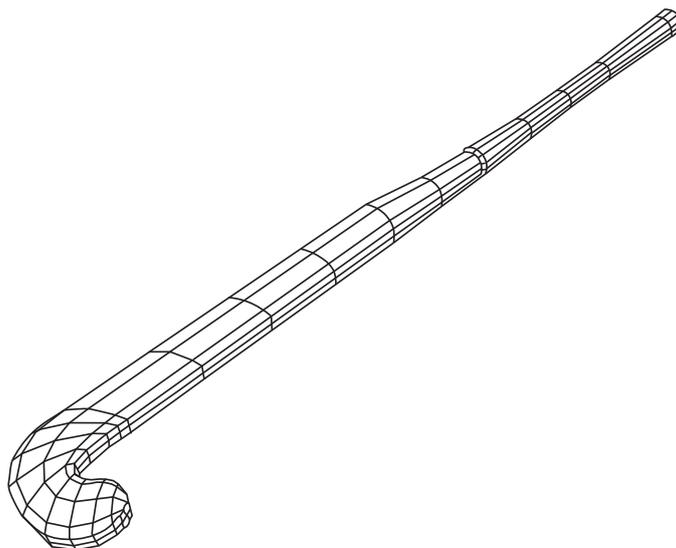
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(d) The image below shows a virtual model of a new hockey stick.



Explain **two** reasons for creating a virtual model of a new hockey stick.

(4)

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- 2
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*(e) Discuss the ways in which carbon fibre has had an impact on the performance of sports equipment.

(6)

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(Total for Question 14 = 19 marks)

TOTAL FOR PAPER = 80 MARKS



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