

Write your name here

Surname

Other names

Centre Number

Candidate Number

Edexcel GCSE

**Design and Technology:
Resistant Materials Technology
Unit 2: Knowledge and Understanding of
Resistant Materials Technology**

Friday 7 June 2013 – 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.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

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PEARSON

Answer ALL the questions.

For each question 1 to 10, choose an answer A, B, C or D. Put a cross in the box indicating the answer you have chosen ☒. 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 following is **not** a manufactured board?

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

(Total for Question 1 = 1 mark)

2 Which **one** of the following is iron alloyed with to make mild steel?

- A** Carbon
- B** Zinc
- C** Brass
- D** Aluminium

(Total for Question 2 = 1 mark)

3 Which **one** of the following processes involves the use of heat?

- A** Turning
- B** Laminating
- C** Vacuum forming
- D** Pop riveting

(Total for Question 3 = 1 mark)

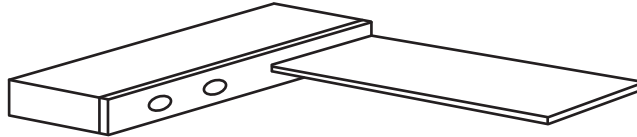
4 Which **one** of the following tools is an abrading tool?

- A** Plane
- B** File
- C** Chisel
- D** Saw

(Total for Question 4 = 1 mark)



5 What is the tool below used for?



- A Measuring angles
- B Marking out and checking right angles
- C Marking lines parallel to an edge
- D Measuring small distances

(Total for Question 5 = 1 mark)

6 Photovoltaic cells react to which form of energy?

- A Solar
- B Wind
- C Tidal
- D Oil

(Total for Question 6 = 1 mark)

7 Which **one** of the following is **not** a property of mild steel?

- A Magnetic
- B Malleable
- C Tough
- D Plasticity

(Total for Question 7 = 1 mark)

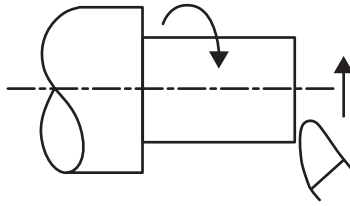
8 Reactive glass will change colour when subjected to which **one** of the following?

- A Sunlight
- B Heat
- C Water
- D Cold

(Total for Question 8 = 1 mark)



9 Which turning process is shown below?



- A Parallel turning
- B Facing
- C Taper turning
- D Parting

(Total for Question 9 = 1 mark)

10 Which **one** of the following best describes the process of case hardening?

- A Removes the brittleness of the metal once hardened
- B Increases the hardness of the metal
- C Makes the surface shiny
- D Makes the outside surface harder

(Total for Question 10 = 1 mark)

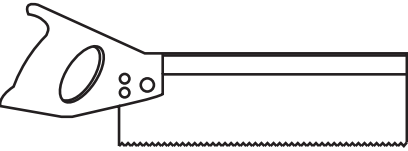
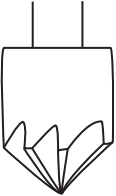
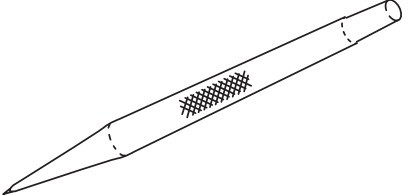
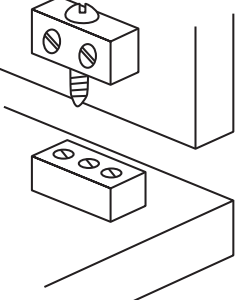


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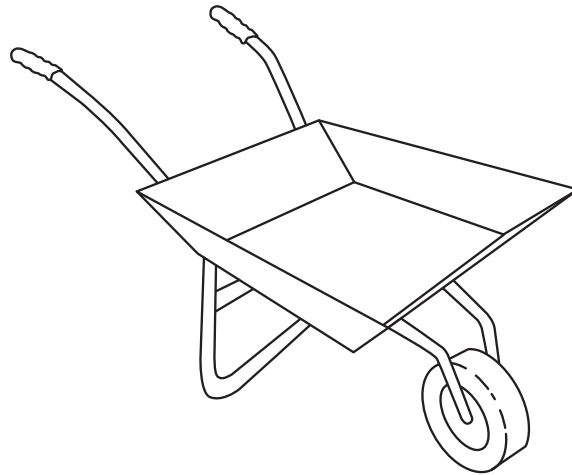
11 (a) The table below shows some tools and equipment.

Complete the table below by giving the missing names and uses.

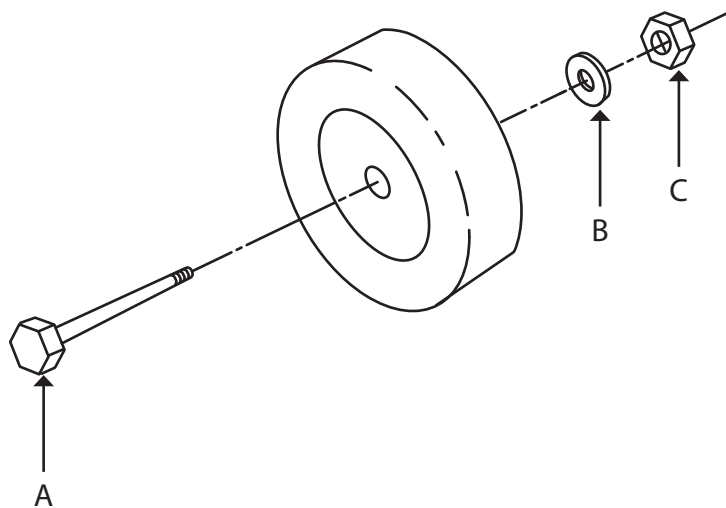
Tools/Equipment	Name	Use
	Tenon saw	(1)
	(1)	Creates a shape for a screw head to sit in
	Scriber	(1)
	Knock down fitting	(1)



(b) The diagram below shows a wheelbarrow.



The drawing below shows an exploded view of the front axle for the wheelbarrow.



(i) Name the parts labelled A, B and C.

(3)

A

B

C

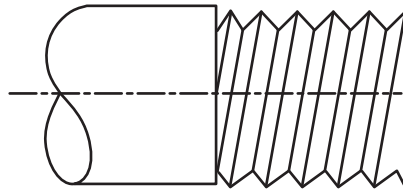
(ii) State whether the joining method shown above is a temporary or permanent joining method.

(1)

.....

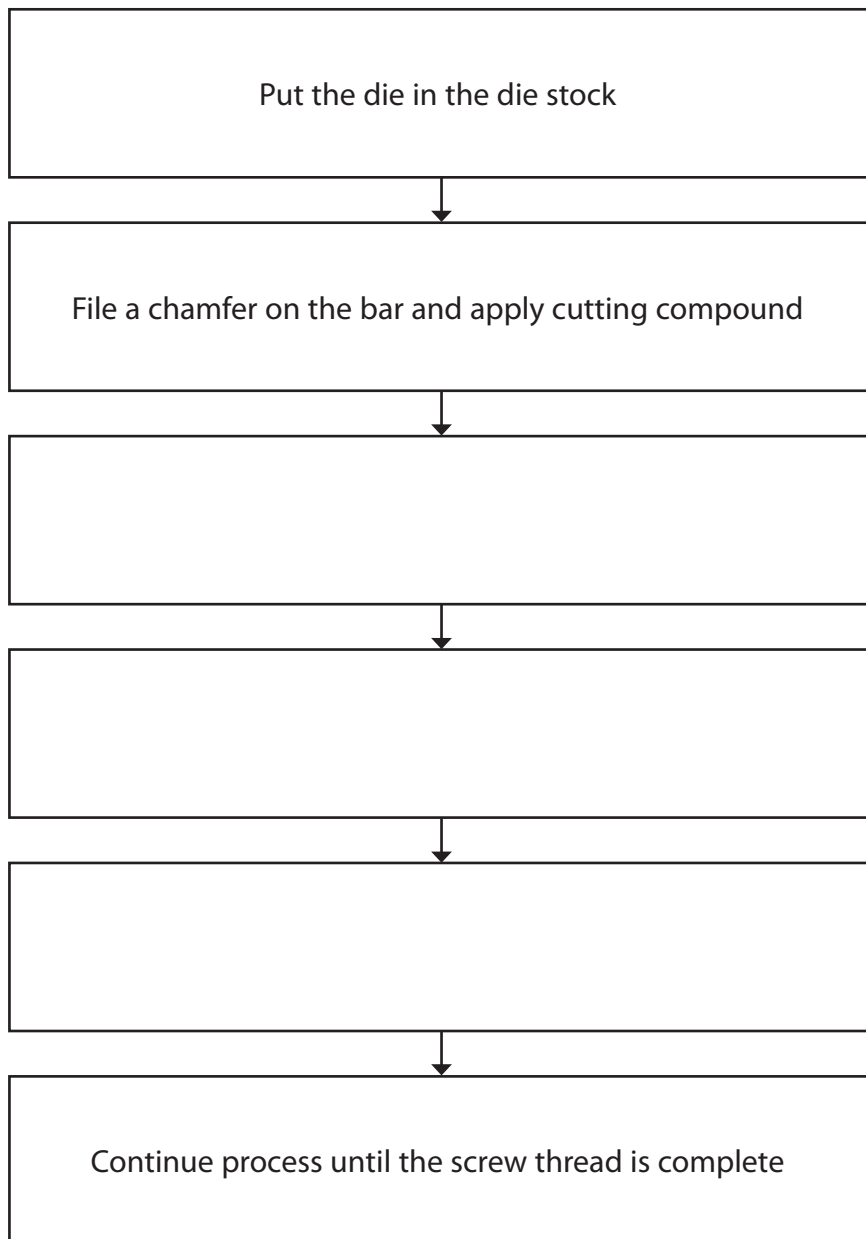


(c) The external screw thread shown below can be made using hand tools in a school workshop.



Complete the flow chart to show the correct sequence for cutting a screw thread. Some stages have been completed for you.

(3)



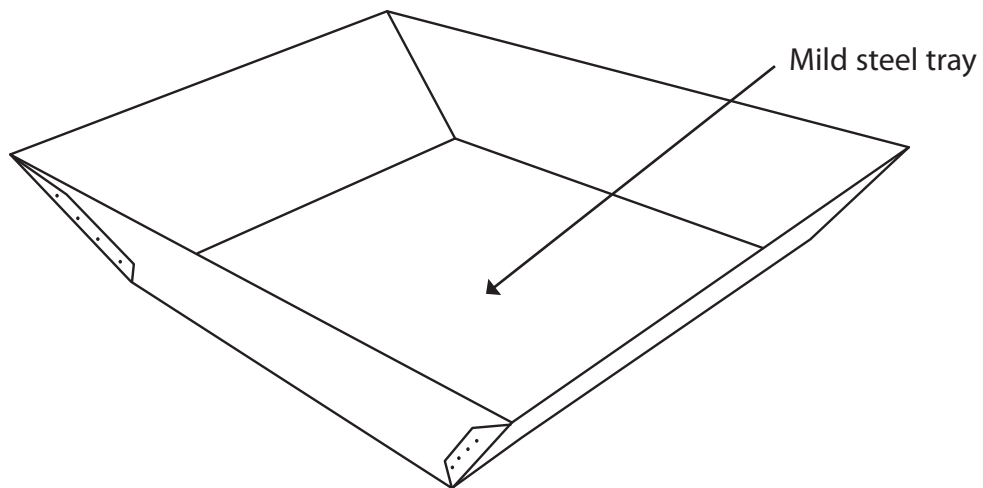
(d) Name **two** different metal joining processes which involve the use of heat.

(2)

1

2

(e) The wheelbarrow tray is made from mild steel.



Explain **two** advantages of making the wheelbarrow tray from mild steel.

(4)

1

.....

.....

2

.....

.....

(f) Explain **one** way in which materials can be reduced in the manufacture of the wheelbarrow.

(2)

.....

.....

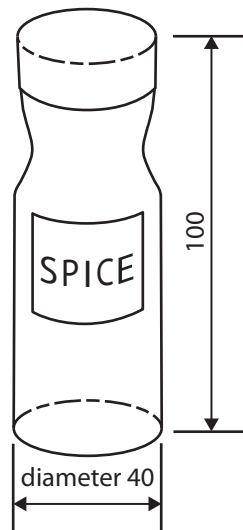
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(Total for Question 11 = 19 marks)



12 You have been asked to design a spice jar holder.

Dimensions of spice jar



All dimensions in mm

The specification for the spice jar holder is that it must:

- hold four spice jars
- keep the spice jars upright
- allow for easy removal of spice jars
- have a stable base
- be portable
- stop the jars from falling out when moved
- be made from materials available in a school workshop
- be manufactured using processes available in a school workshop.

In the spaces opposite, use sketches and, where appropriate, brief notes to show **two different** design ideas for the spice jar holder 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.

PLEASE DO NOT WRITE OR DRAW IN THIS SPACE.

PLEASE USE THE SPACES OPPOSITE FOR YOUR DESIGNS.



Design idea 1

(8)

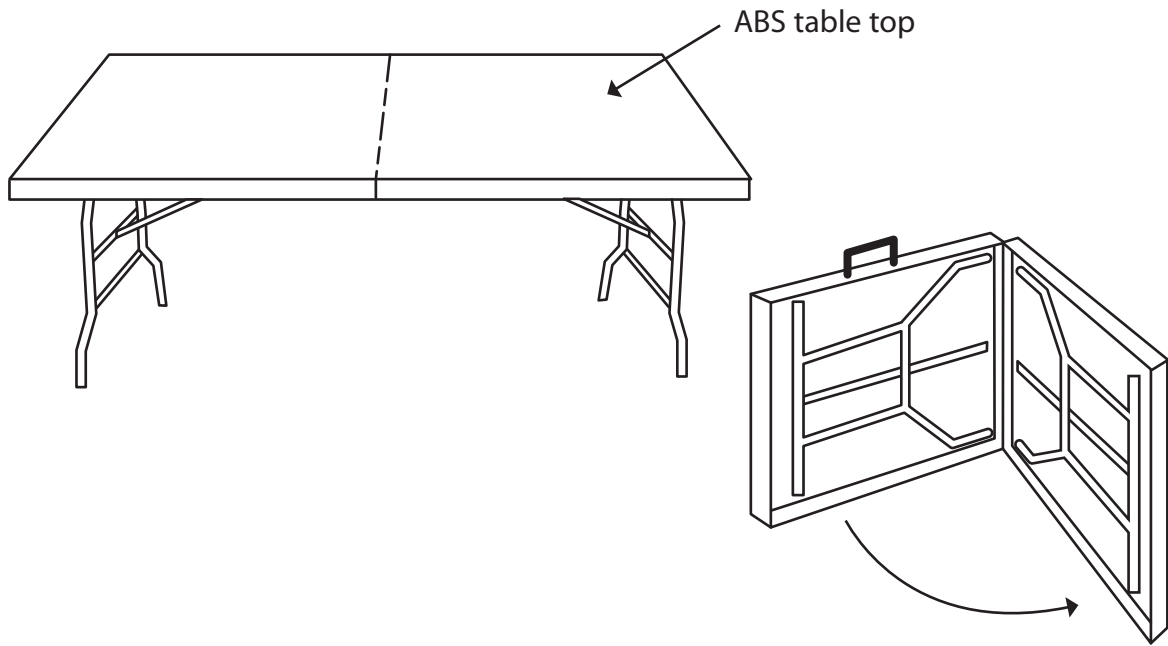
Design idea 2

(8)

(Total for Question 12 = 16 marks)



13 The drawing below shows a garden table.



(a) Give **two** properties of ABS which make it suitable for the table top.

(2)

1

2

(b) The legs of the garden table are made from mild steel.

(i) Give **two** reasons for applying a surface finish to the mild steel table legs.

(2)

1

2

(ii) Name **two** finishes that could be applied to the mild steel table legs.

(2)

1

2



(c) Explain why the garden table is successful in meeting the following specification points:

(i) easy to keep clean

(2)

.....

.....

.....

.....

(ii) easy to store away in winter.

(2)

.....

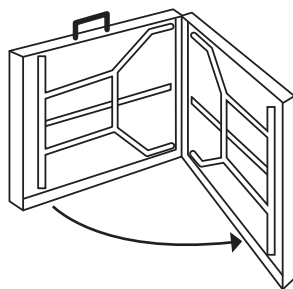
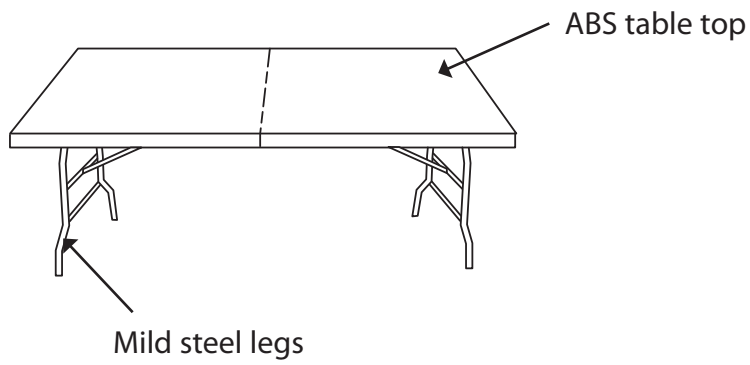
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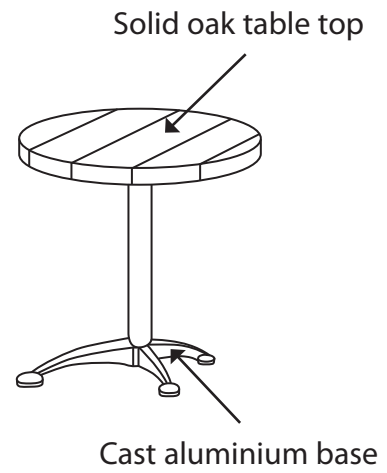
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*(d) The drawing below shows two different types of garden table.



Garden Table A



Garden Table B



Evaluate garden table A compared with garden table B in terms of user requirements and sustainability.

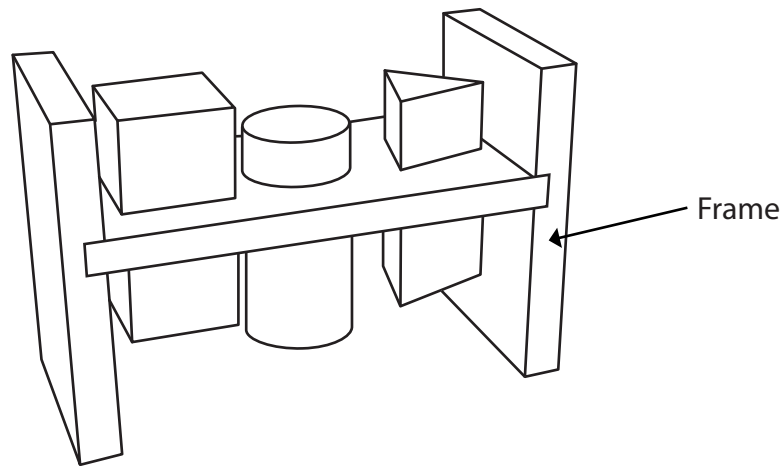
(6)

Dotted lines for writing the answer.

(Total for Question 13 = 16 marks)



14 The drawing below shows a child's toy.

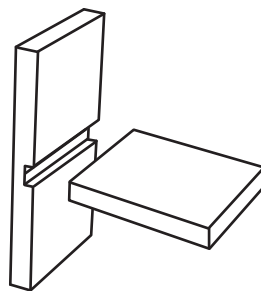


The frame of the child's toy is made from oak.

(a) Give **two** properties of oak that make it suitable for the frame of the child's toy. (2)

1

2



(b) (i) Name the type of joint shown above which is used in the frame. (1)

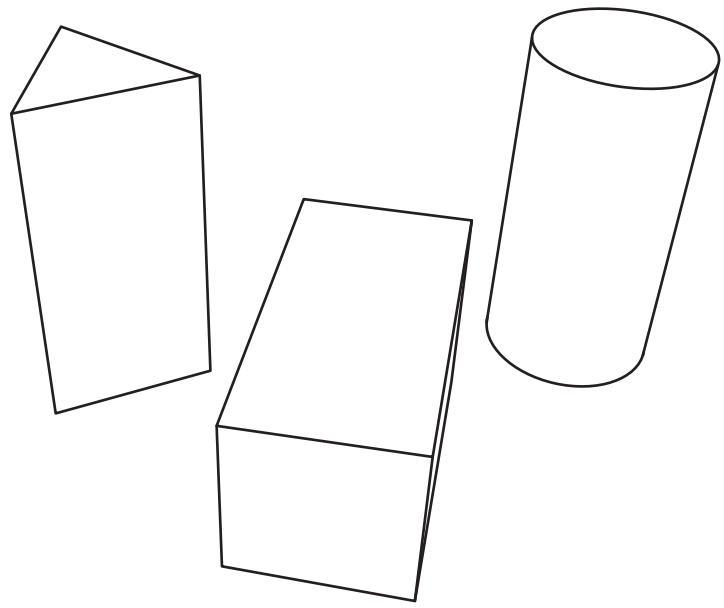
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(ii) Name an appropriate adhesive to use when gluing the joint. (1)

.....



(c) The shaped blocks shown below are made from polyvinyl chloride (PVC).



(i) Give **two** properties of PVC that make it suitable for the shaped blocks.

Justify your answer for each property.

(4)

Property 1

Justification

Property 2

Justification

(ii) The shaped blocks are hollow.

Name **one** process that could be used to make the hollow shaped blocks.

(1)



(d) The final toy design was virtually modelled and tested using computer-aided design (CAD).

Describe **two** advantages of virtually modelling and testing the final design using CAD before starting manufacture.

(4)

1

.....

.....

.....

2

.....

.....

.....



* (e) It is said that we live in a 'throwaway' culture.

Discuss the ways in which built-in product obsolescence contributes to a 'throwaway' culture.

(6)

Ruled area for writing the answer, consisting of multiple horizontal dotted lines.

(Total for Question 14 = 19 marks)

TOTAL FOR PAPER = 80 MARKS



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