Write your name here

Surname	Other names

Edexcel GCSE

Centre Number	Candidate Number

Design and Technology: Resistant Materials Technology

Unit 2: Knowledge and Understanding of Resistant Materials Technology

Wednesday 27 June 2012 – Morning
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 ▶

P39421A

6/6/6/c4/c4

P 3 9 4 2 1 A 0 1 1 6

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 50,000 plastic ice cream pots are required.

Which **one** of the following processes is best for the manufacture of the pots?

☒ **A** Casting

☒ **B** Vacuum forming

☒ **C** Extrusion

☒ **D** Laminating

(Total for Question 1 = 1 mark)

2 Which **one** of the following tools is used with a hammer to mark out where a hole is to be drilled in a piece of metal?

☒ **A** Centre punch

☒ **B** Try square

☒ **C** Scriber

☒ **D** Twist drill

(Total for Question 2 = 1 mark)

3 Which **one** of the following materials is a composite?

☒ **A** Zinc

☒ **B** Acrylic

☒ **C** Carbon fibre

☒ **D** Reactive glass

(Total for Question 3 = 1 mark)

4 Many retailers make use of an EPOS system. What does the term EPOS stand for?

☒ **A** Electronic profit on sales

☒ **B** Efficient promotion of stock

☒ **C** Economical production of stock

☒ **D** Electronic point of sale

(Total for Question 4 = 1 mark)

5 Which **one** of the following is a ferrous metal?

☒ **A** Aluminium

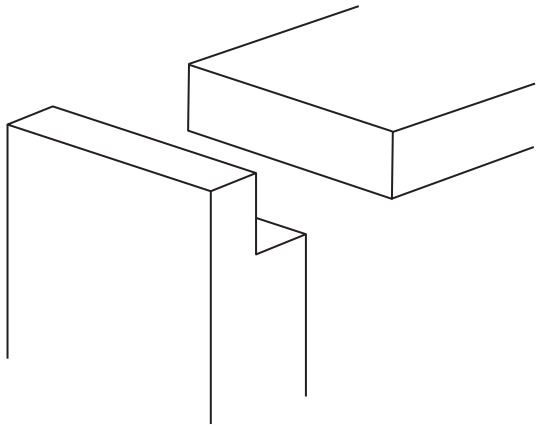
☒ **B** Stainless steel

☒ **C** Brass

☒ **D** Copper

(Total for Question 5 = 1 mark)

6 What type of joint is shown in the diagram below?



☒ **A** Mortise and tenon joint

☒ **B** Dowel joint

☒ **C** Rebate joint

☒ **D** Dovetail joint

(Total for Question 6 = 1 mark)

7 What electronic system is identified by the logo shown below?

☒ **A** Videoconferencing

☒ **B** CAD/CAM

☒ **C** Bluetooth®

☒ **D** CNC

(Total for Question 7 = 1 mark)

8 Photochromic paint changes colour when exposed to:

- ☒ **A** heat
- ☒ **B** water
- ☒ **C** sunlight
- ☒ **D** cold

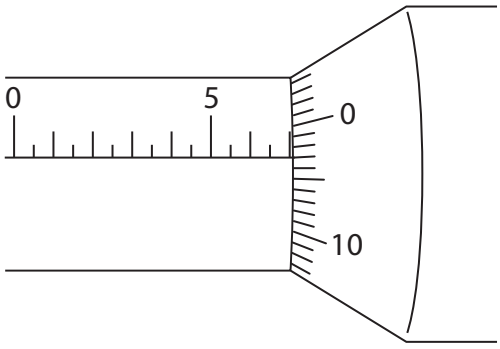
(Total for Question 8 = 1 mark)

9 Hardness is defined as:

- ☒ **A** the ability of a material to be deformed by compression without cracking or tearing
- ☒ **B** the ability of a material to withstand abrasive wear and indentation
- ☒ **C** the ability of a material to withstand sudden shock loading without fracture
- ☒ **D** the ability of a material to return to its original shape after a deforming force has been removed

(Total for Question 9 = 1 mark)

10 What is the reading shown on the micrometer below?

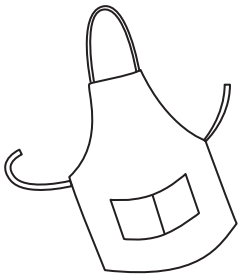
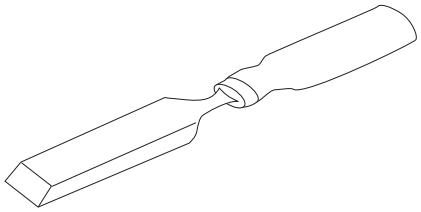
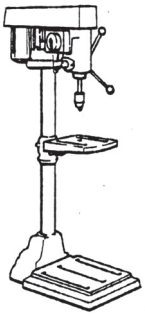
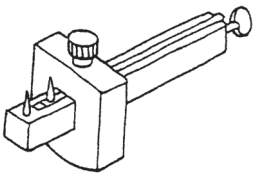


- ☒ **A** 7.03 mm
- ☒ **B** 7.06 mm
- ☒ **C** 7.30 mm
- ☒ **D** 7.60 mm

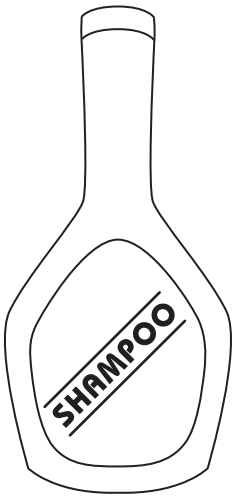
(Total for Question 10 = 1 mark)

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
	Apron	(1)
	Chisel	(1)
	(1)	For drilling holes
	(1)	For marking lines parallel to an edge

(b) The drawing below shows a shampoo bottle.



The shampoo bottle is made from polyvinyl chloride (PVC) and is blow moulded.

(i) Give **three** properties of polyvinyl chloride.

(3)

1 .....

2 .....

3 .....

(ii) Give **one** disadvantage of using polyvinyl chloride for the shampoo bottle.

(1)

.....

(iii) Describe **two** advantages of manufacturing the bottle by blow moulding rather than by injection moulding.

(4)

1 .....

.....

2 .....

.....

(c) Minimising waste during production of the shampoo bottles is important.

Give **three** ways in which waste can be minimised during the production of the shampoo bottles.

(3)

1 .....

2 .....

3 .....

(d) Describe **two** ways in which the manufacturer of the shampoo bottles can use renewable sources of energy.

(4)

1 .....

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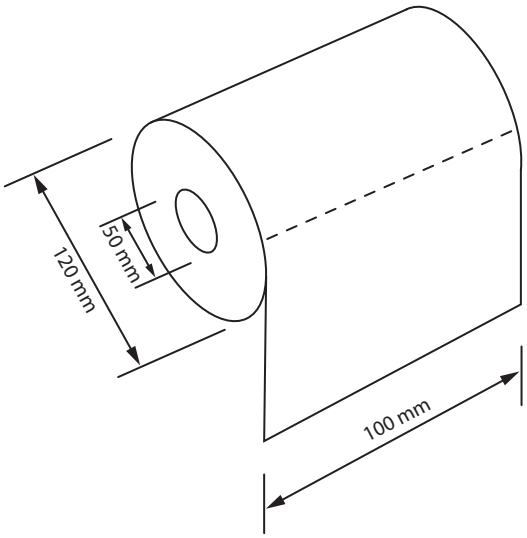
2 .....

.....

(Total for Question 11 = 19 marks)

12 You have been asked to design a toilet roll holder.

Dimensions of toilet roll



The specification for the toilet roll holder is that it must:

- hold one toilet roll
- provide storage space for a spare roll
- allow the toilet paper to be unrolled
- allow the toilet roll to be easily replaced
- be easily fixed to a wall
- be easily cleaned
- 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 toilet roll 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 photograph below shows a mild steel dustbin.

(a) Give **two** properties of mild steel which make it suitable for the dustbin.

(2)

1 .....

2 .....

(b) The surface of the dustbin has been plated with zinc.

Describe **two** reasons why plating with zinc is a suitable surface finish for the dustbin.

(4)

1 .....

.....

.....

.....

2 .....

.....

.....

.....

(c) Explain how the dustbin is successful in meeting the following specification points:

(i) keeping the rubbish inside

(2)

(ii) being easy to move.

(2)

*(d) The photographs below show two different types of dustbin.

Dustbin A – mild steel

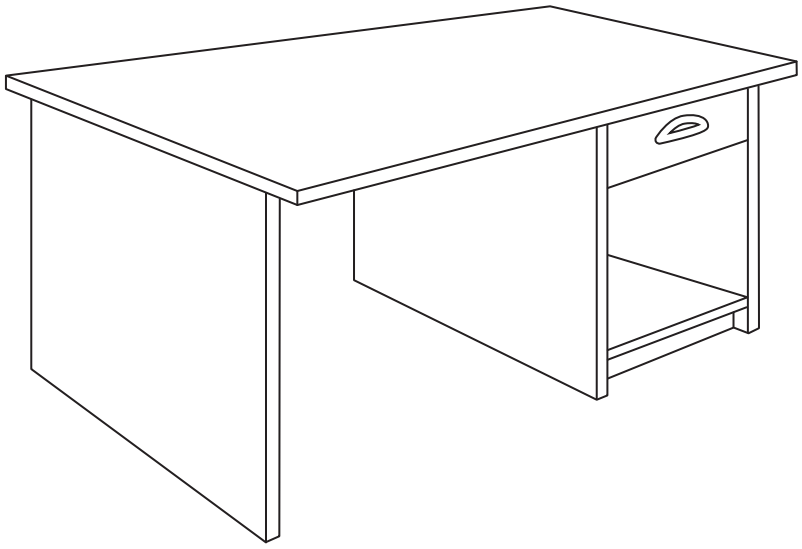
Dustbin B (Wheelie Bin) – ABS

Evaluate dustbin A compared with dustbin B in terms of 'user requirements' and 'performance requirements' for the householder.

(6)

(Total for Question 13 = 16 marks)

14 The drawing below shows a computer desk made from medium density fibreboard (MDF).

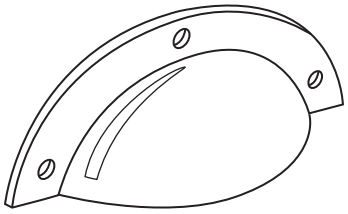


(a) Name **one** other suitable manufactured board that could have been used to manufacture the computer desk.

(1)

.....

(b) The handle of the desk drawer is made from brass.



(i) Name the **two** metals that are used to make brass.

(2)

1 .....

2 .....

(ii) Give **one** property of brass that makes it suitable for the handle.

Justify your answer.

(2)

Property

.....

Justification

.....

.....

(c) The desk is joined together with knock down fittings, enabling it to be put together in a consumer's home.

Explain **two** reasons why consumers may prefer to buy furniture that uses knock down fittings.

(4)

1 .....

.....

2 .....

.....

(d) The computer desk was designed using computer-aided design (CAD).

Describe **two** advantages for the designer of using CAD to design the computer desk.

(4)

1 .....

.....

2 .....

.....

***(e)** Natural wood and timber need to be conserved.

Discuss the ways in which natural wood and timber can be conserved when manufacturing products.

(6)

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(Total for Question 14 = 19 marks)

TOTAL FOR PAPER = 80 MARKS