

Please check the examination details below before entering your candidate information

Candidate surname

Other names

**Pearson Edexcel
GCE**

Centre Number

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Candidate Number

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Monday 13 May 2019

Afternoon (Time: 1 hour 30 minutes)

Paper Reference **6RM02/01**

Design and Technology

Product Design: Resistant Materials Technology

Advanced Subsidiary

Unit 2: Design and Technology in Practice

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.*
- 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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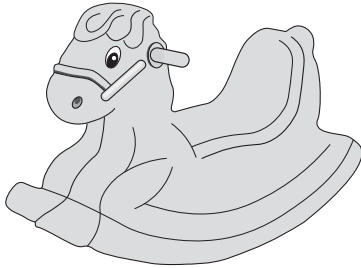



Pearson

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

- 1** (a) Identify a suitable moulding method for commercially producing each of the following polymer items.

(3)



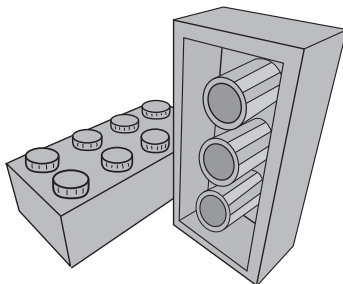
1. A child's hollow ride-on toy

Method



2. A five metre length of gutter

Method



3. A child's building brick

Method

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- (b) Figure 1 shows an electrical plug. The body of the plug is made of urea formaldehyde as it is a good electrical insulator.

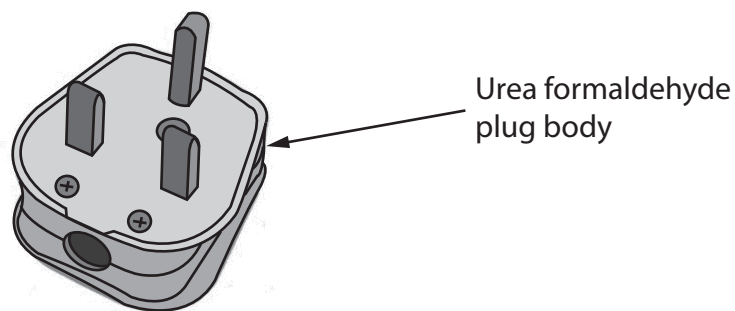


Figure 1

Explain **two** further properties that make urea formaldehyde a more suitable polymer than high density polyethylene (HDPE) for manufacturing the electrical plug.

(4)

1

2

(Total for Question 1 = 7 marks)



- 2 (a) Normalising is a process that is undertaken on ferrous metals that have become hardened.

Describe the normalising process.

(2)

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(b) Figure 2 shows a stool with a frame made from mild steel.

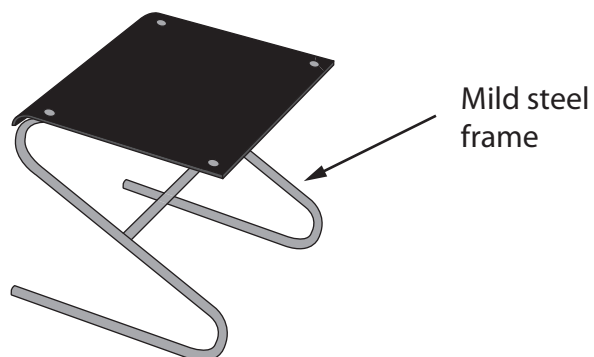


Figure 2

Two reasons why the manufacturer selected mild steel for the frame are its ability to be welded and its appropriate strength.

Give **six** further reasons that make mild steel a suitable material from which to manufacture the frame.

(6)

- 1
- 2
- 3
- 4
- 5
- 6

(Total for Question 2 = 8 marks)



- 3 Figure 3 shows a piece of children's play equipment. The sides of the ladder are made from plywood and the slide is made from glass reinforced plastic (GRP).

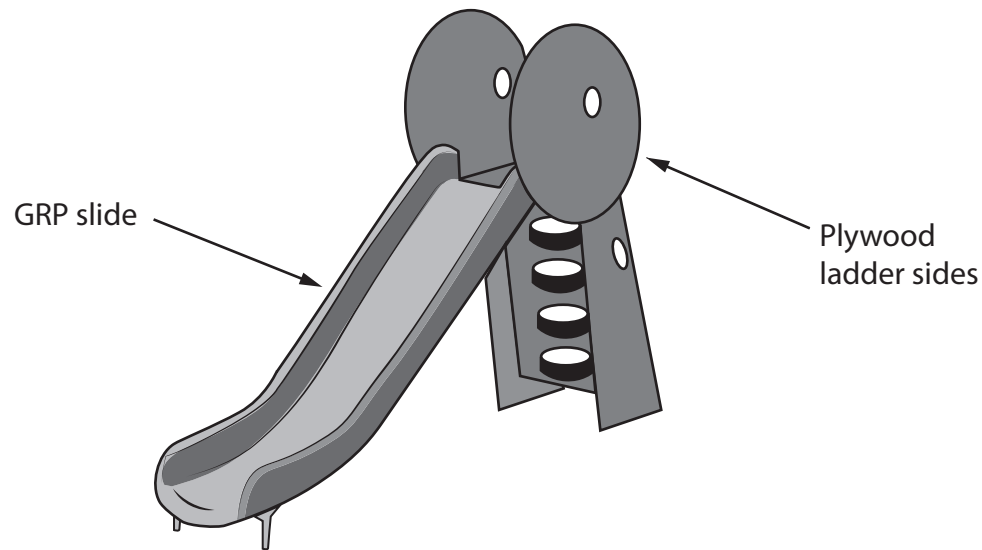


Figure 3

- (a) Outline **five** advantages of using plywood in preference to solid wood for the manufacture of the ladder sides.

(5)

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(b) Describe the steps involved in producing the glass reinforced plastic (GRP) slide.
Your description should start after the mould has been produced.

(7)

(Total for Question 3 = 12 marks)



P 5 7 4 6 1 A 0 7 1 6

4 Metal inert gas (MIG) welding is frequently used to join steel components.

(a) Outline, using notes and/or sketches, the features of the MIG welding process.

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(b) A risk assessment would need to be completed before a worker carries out the MIG welding process.

Outline **six** hazards of the MIG welding process.

(6)

1

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(Total for Question 4 = 11 marks)



P 5 7 4 6 1 A 0 9 1 6

- 5 (a) Figure 4 shows two pieces of hardwood that have been joined using a countersunk wood screw.

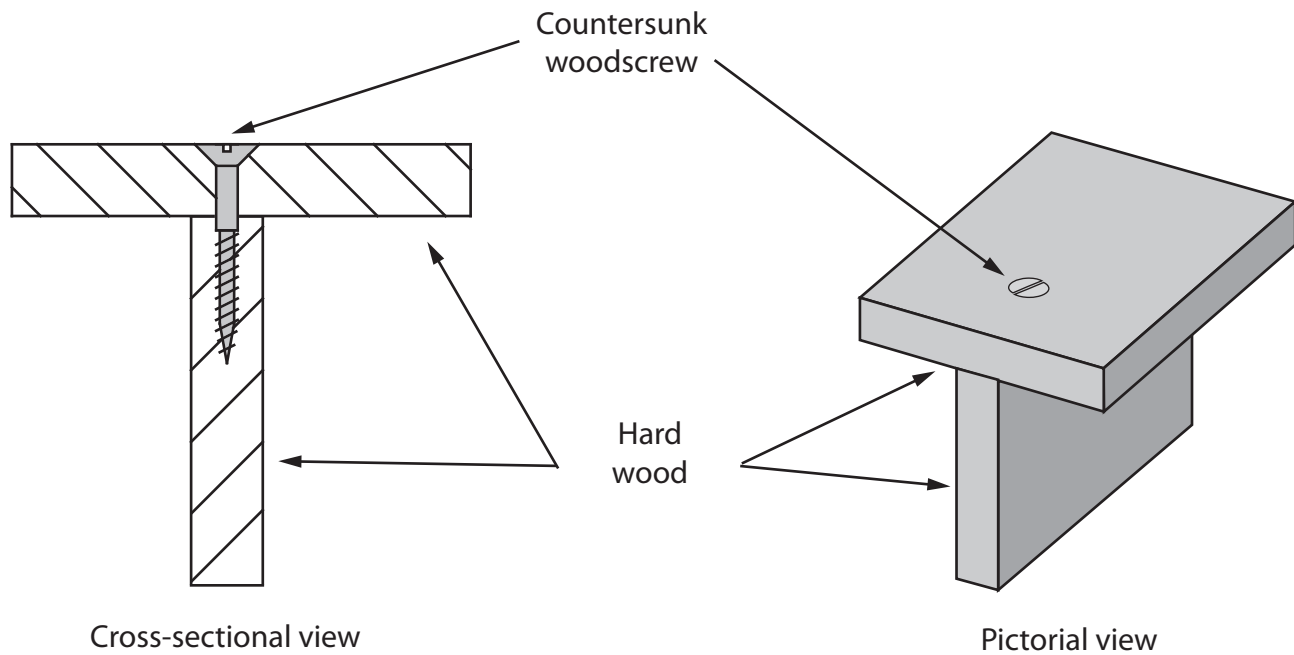


Figure 4

Describe the steps involved in producing the joint. Presume the position where the screw is to be fitted has already been marked out.

(4)



- (b) Figure 5 shows an assembled model kit made from plywood components. The plywood components have been produced using a computer numerically controlled (CNC) laser cutter.



(Source: Solar Technology International Ltd © 2018)

Figure 5

Evaluate the effectiveness of using a CNC laser cutter in preference to a CNC router to produce the plywood components.

(8)

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(Total for Question 5 = 12 marks)



6 (a) When a business develops a new product, a one-off prototype is made for testing purposes.

(i) Describe the characteristics of one-off production.

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(ii) Explain why one-off production methods are often chosen for prototype production.

(2)

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*(b) Figure 6 shows two mass-produced kettles that have bodies made from different materials.

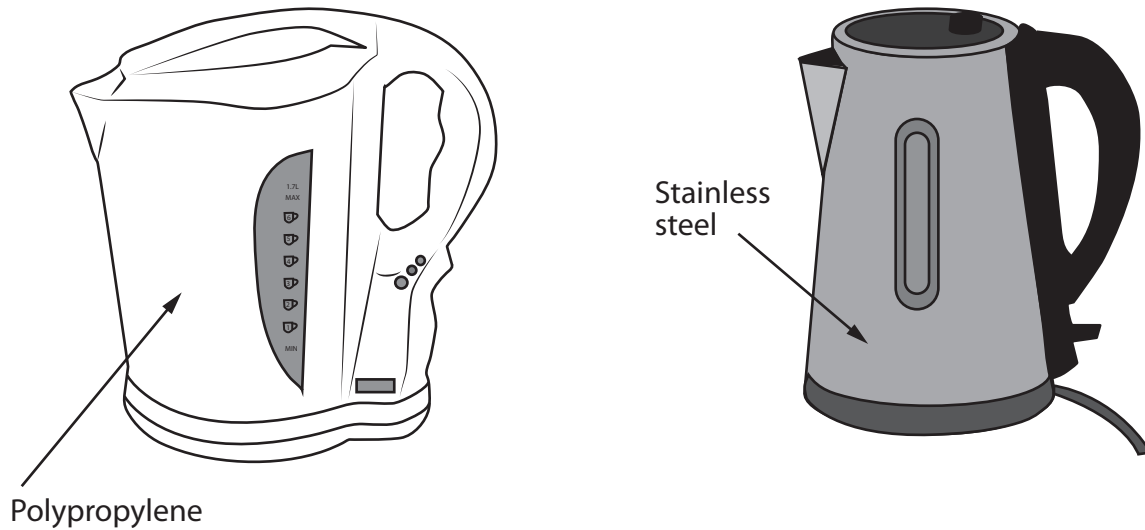


Figure 6

One of the reasons a business may select polypropylene in preference to stainless steel for the body of the kettle is that it is a cheaper material.

Justify further why a business may select polypropylene in preference to stainless steel for the kettle body.

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(Total for Question 6 = 10 marks)



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***7** Evaluate how an effective quality assurance (QA) system affects a manufacturing business.

(10)

Handwriting practice area with horizontal dotted lines.



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(Total for Question 7 = 10 marks)

TOTAL FOR PAPER = 70 MARKS

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