Write your name here

Surname	Other names

Pearson Edexcel GCE

Centre Number | | | | | |

Candidate Number | | | | |

Design and Technology

Product Design: Resistant Materials Technology
Advanced Subsidiary
Unit 2: Design and Technology in Practice

Monday 14 May 2018 – Afternoon
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.*
- 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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P 5 5 5 4 8 A 0 1 1 6

Pearson

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

1 (a) Tensol cement is ideally suited to bond a specific polymer.

Name the polymer.

(1)

.....

(b) Tensol cement contains volatile organic compounds (VOCs).

Outline **two** hazards that arise from the use of VOCs.

(2)

1 .....

.....

2 .....

.....

(c) Two pieces of wood are to be bonded together using either polyvinyl acetate (PVA) or contact adhesive. Strength of the adhesive is one factor that will influence the choice.

Give **five** further factors that will affect whether PVA or contact adhesive is selected for the task.

(5)

1 .....

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2 .....

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3 .....

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4 .....

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5 .....

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(Total for Question 1 = 8 marks)

2 Figure 1 shows a DVD case that has been moulded as a single piece with integral hinges and clips.

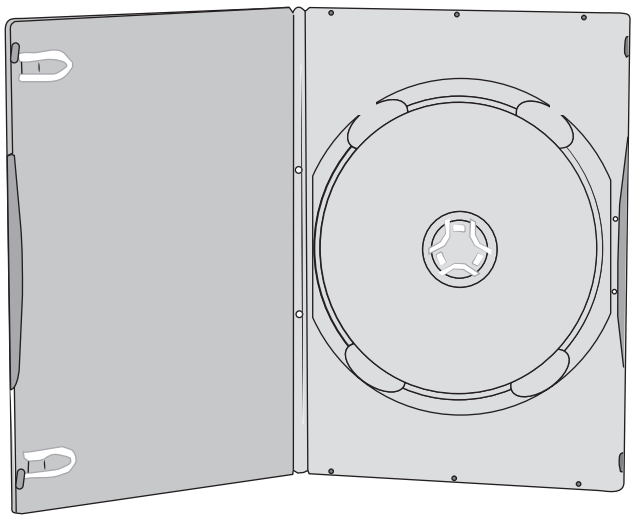

Figure 1

(a) Name the polymer that is most suitable for the manufacture of the DVD case.

(1)

.....

(b) The polymer used must have sufficient strength and toughness for the task. Strength and toughness are mechanical properties.

Give **four** further mechanical properties that the polymer needs in order to function effectively as a DVD case.

(4)

1 .....

2 .....

3 .....

4 .....

(c) During manufacture, a sample of the moulded DVD cases will be checked for functionality. One quality control test will check the dimensional accuracy of the DVD cases.

Describe **three** further functional quality control checks that will be carried out on the finished DVD cases.

(3)

1 .....

.....

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2 .....

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(Total for Question 2 = 8 marks)

3 (a) Figure 2 shows two views of a joint between two pieces of 3mm thick steel. The joint requires a rivet to be fitted through the hole.

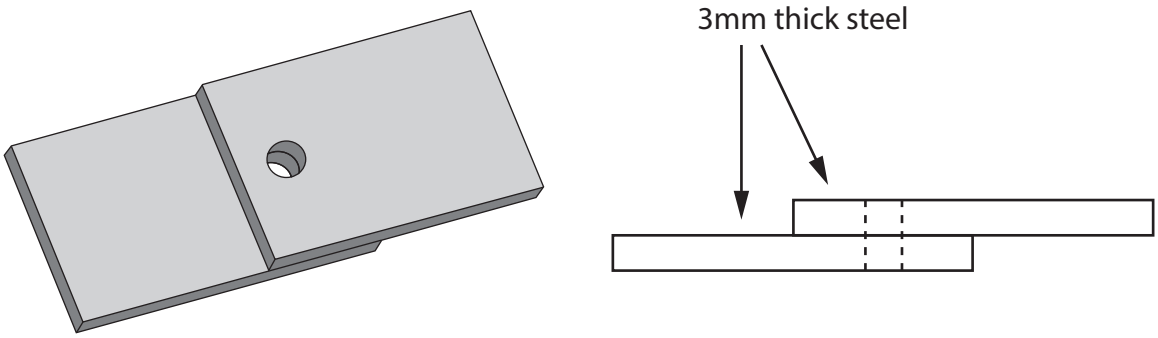
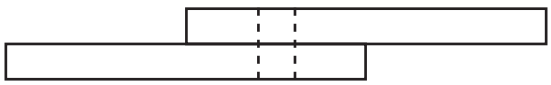


Figure 2

In the box below, complete the diagram to show a snap head rivet securely fitted in the hole and flush on one side of the joint.

(2)



(b) Explain **two** advantages of using pop rivets in preference to snap rivets for joining sheet metal.

(4)

1 .....

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2 .....

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(c) Figure 3 shows two different types of follower used with cams.

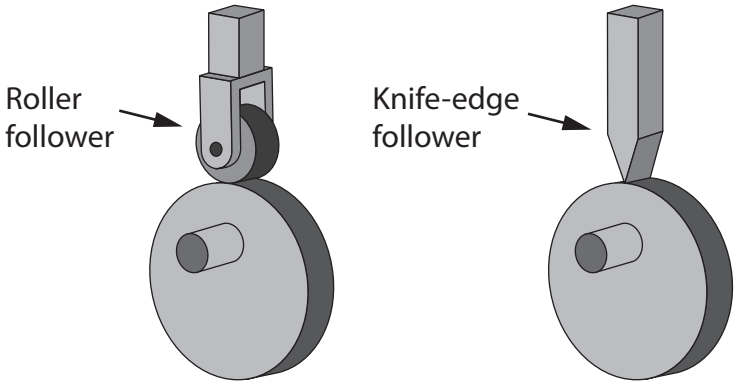

Figure 3

Evaluate the use of a roller follower in preference to a knife-edge follower.

(5)

(Total for Question 3 = 11 marks)

4 (a) Sand casting is a hazardous process. When pouring molten metal, workers are required to wear protective head gear, gauntlets and an apron.

Name **three** other items of personal protective equipment (PPE) that should be used when pouring molten metal.

(3)

1 .....

2 .....

3 .....

(b) Both die casting and sand casting are commonly used in industry.

Explain **three** advantages of die casting in preference to sand casting.

(6)

1 .....

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3 .....

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(Total for Question 4 = 9 marks)

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5 Figure 4 shows a stainless steel swimming pool ladder.

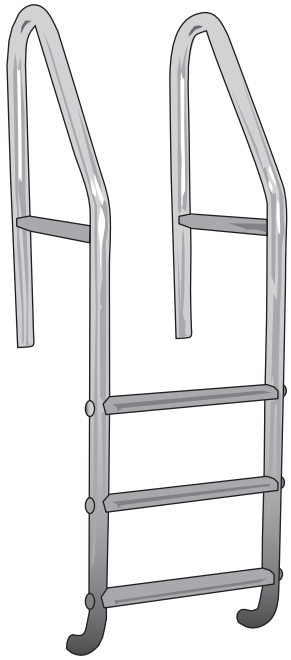

Figure 4

(a) Stainless steel is used to manufacture the ladder as it is sufficiently strong and durable.

State **six** further properties of stainless steel that make it a suitable material from which to manufacture the ladder.

(6)

1 .....

2 .....

3 .....

4 .....

5 .....

6 .....

(b) Products manufactured to comply with BSI standards should be safer to use. This could lead to increased sales for a business.

Evaluate how a product complying with BSI standards may further affect a business.

(8)

(Total for Question 5 = 14 marks)

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6 Smart materials are now commonly used in a wide range of situations.

(a) Name the property that causes smart paint to change colour under ultraviolet light.

(1)

.....

*(b) Figure 5 shows a watch that uses an electroluminescent panel to illuminate the display.

Figure 5

Question 6(b) continues on the next page.

An electroluminescent panel is chosen as it consumes minimal power and is very thin.

Outline further advantages of selecting an electroluminescent panel for illuminating the watch display.

(9)

(Total for Question 6 = 10 marks)

***7** A continuous production system is the cheapest and fastest method of meeting a large demand for a product.

Evaluate further why a business might select a continuous production system for manufacturing a large demand product.

(10)

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(Total for Question 7 = 10 marks)

TOTAL FOR PAPER = 70 MARKS

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